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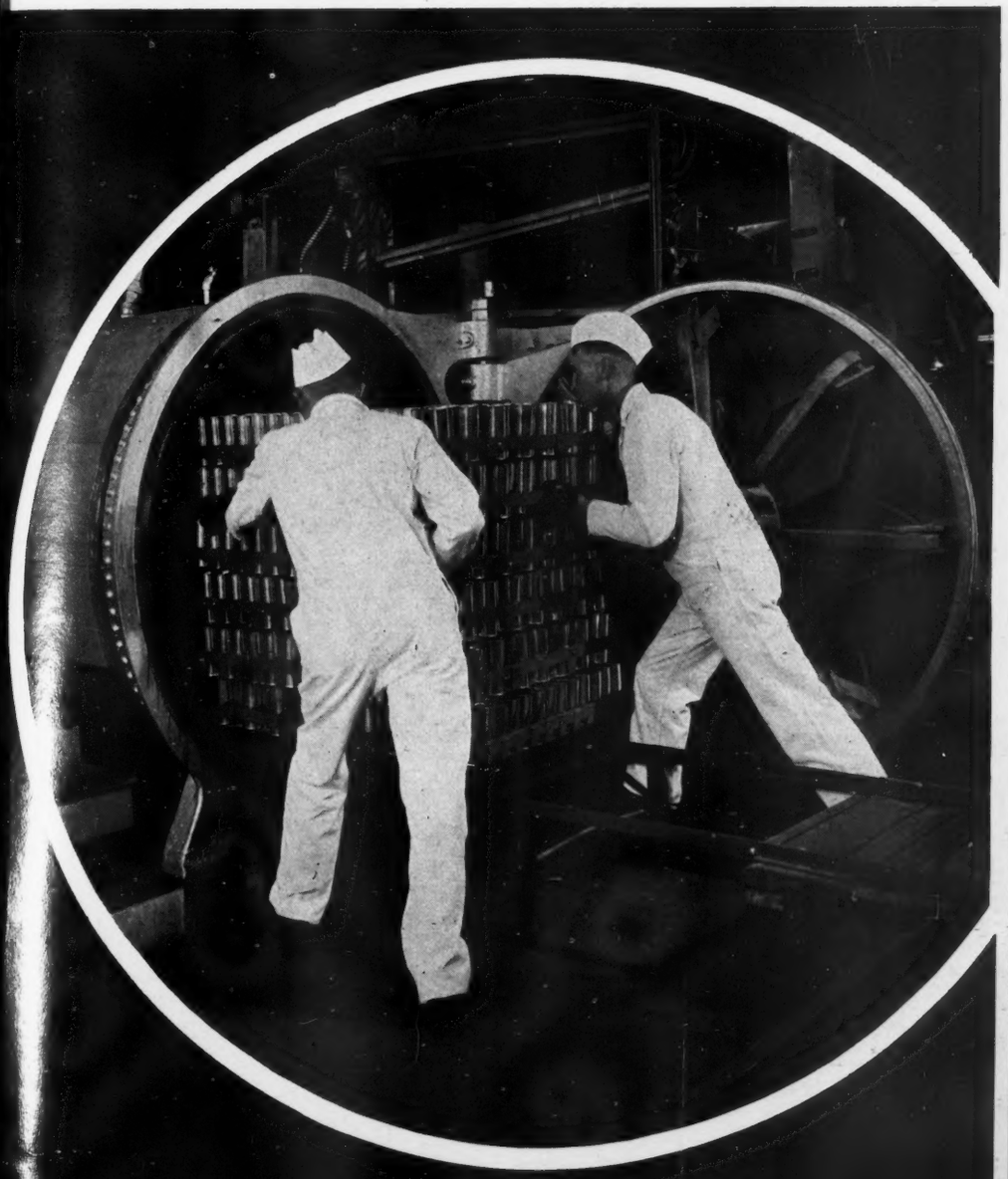
FOOD INDUSTRIES

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



OCTOBER 1942

Use of Tunnel Dehydraters for Vegetables

Meat Dehydration On Plant Scale

How Government Buys Foods

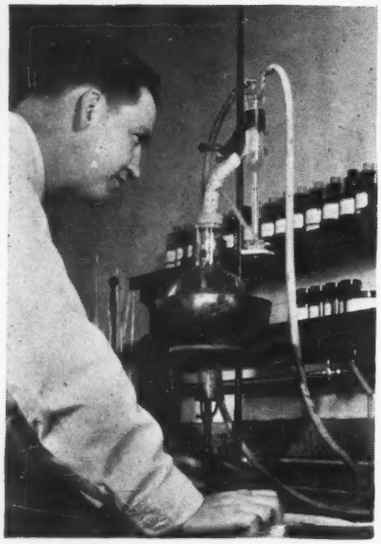
Revolution Comes To Food Industry

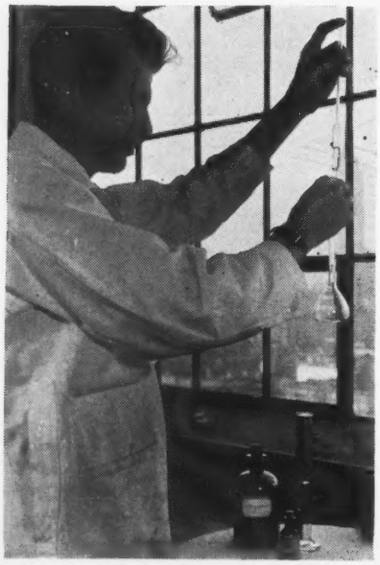
Improvements Help Do Wartime Job

Concentrating Food Manufacture

A McGRAW-HILL PUBLICATION

BACKGROUND VALUES . . . a PART of the product, APART from the price





No part of our organization carries a greater burden of responsibility today than that of our Division of Research, for it is here that direction and inspiration for the creation of our many successful duplications of unavailable raw materials usually originates. A notable example of this work is the development of our OIL CASSIA IMITATION which is now serving hundreds of food, beverage and confectionery manufacturers as a *complete* and economical replacement for the natural oil. And we doubt, even after normal conditions are again restored, that the natural product will re-supplant this amazingly effective substitute. Such work by our technical staff serves constantly to insure our customers the rich fruits of carefully organized research . . . a PART of Fritzsche products, APART from their price.

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THE COVER

October is olive-harvesting month in California. After picking, grading and processing, ripe olives are packed and sterilized in a retort at 240 deg. F. for one hour. And in California this operation is checked by the State's department of public health to avoid underprocessing.

The picture on the cover, reproduced above, shows canned ripe olives being loaded into a horizontal retort in the plant of Lindsay Ripe Olive Co., Lindsay, Calif. This is one of the series of operations illustrated in the "Pictures of Processes" article on pages 54 and 55.

FOOD INDUSTRIES

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This Issue

Things Will Be Different

"Nothing is certain except change," said the philosopher, and in wartime changes occur more rapidly than in times of peace. Nor will the food industries escape—changes already underway in food processing when war broke out will be accelerated and new shifts will appear. What some of these changes are and where they are likely to lead are briefly sketched by Ivan C. Miller, beginning on page 39.

Engineering and Beef

Dehydration as a major method of food processing is so new that there is no existing literature on the subject, except that written from day to day as the industry develops. This month, FOOD INDUSTRIES is fortunate in being able to make two additions to this growing literature.

On page 43, W. B. Van Arsdel, who is chief of engineering development at the USDA's Western Regional Research Laboratory, and one of the few engineering authorities on dehydration, starts a series of three articles on the engineering of tunnel dehydraters.

On page 47, FOOD INDUSTRIES' editorial staff presents an account of the methods developed by Swift & Co., for the dehydration of meat, a process just now emerging from the experimental stage.

Your War Market

Government buying for Lease-Lend and the armed forces has developed into a tremendous market for food manufacturers. But to get a government contract and deliver acceptable products, you must know something about steps involved in getting the business and also what requirements your products must meet to be satisfactory. You can learn a lot about these things in the article, "How the Government Buys Foods," on page 64. The author, H. C. Albin, is chief of the Purchase Branch of the Agricultural Marketing Administration.

It May Happen Here

Wartime conditions in Britain have made it necessary to concentrate food manufacture in fewer factories to release much needed plant space and personnel for war work. That a similar concentration may take place in this country is indicated by recent official statements forecasting the need for such a move. If it does happen here, it likely will follow the pattern set in England. That pattern is described in an article on page 42.

Coming

Larders to Arsenals

While American manufacturers have performed miracles in war production, our production is said by the President to be only half enough to win the war. Which is restating what all have heard but most have not taken sufficiently seriously—that everyone must do everything he can to help. For food manufacturers, this means that all facilities that can be converted to war work should be so converted. And to show what has been done along this line and what can be done, FOOD INDUSTRIES will publish an article based upon official information from Washington.

Keep 'Em Rolling

Widely used in the food industries to speed handling of materials, battery-powered industrial trucks are among the equipment that must be carefully maintained for the duration. For every one of these trucks that goes out of service, several workmen must be hired to do the job—if you can get the workmen. More complicated than most units of plant equipment, these trucks require careful maintenance for maximum life. What this maintenance involves will be told in detail in an article to be published in an early issue of FOOD INDUSTRIES.

Is This Your Scrap?

To feed the insatiable maw of war, an endless flow of materials of all sorts must go to our war-production plants. In particular, old metals of all sorts are needed, as everyone should realize by now. Almost every food plant has a lot of discarded machines or metal parts somewhere about the plant. These should be routed out quickly. What some food companies have already done along these lines will be told in FOOD INDUSTRIES for November.

More Dehydration

In November, FOOD INDUSTRIES will continue to add to the growing literature on dehydration. Two contributions in particular will be noteworthy: First, W. B. Van Arsdel will contribute the second of his three articles on the engineering of tunnel dehydraters. While his first article is general, the second will get down to brass tacks on tunnel-dehydrater design and operation. Second, B. E. Proctor, who heads the course in food technology at M.I.T. and who is an outstanding authority on food processing, will discuss some brief tests that enable the dehydrator to tell whether his vegetables have been sufficiently blanched.

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FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor — OCTOBER, 1942

The Talk of the Industry

Teaching boys is like plowing earth,
Teaching men is like plowing rock,
Teaching old men is like plowing water.
—*An old Berber proverb.*

● SOME of the remarks from West Coast airplane manufacturers about the problems of managing women in aircraft plants arouse a nostalgic mem-

ory. Women are quick to discover a boss whom they can torment, and how! Just about as quick as a dog can spot a person who is afraid of it.

● ALL APPLES, apricots, peaches, pears, prunes and raisins that are dried this year are also "frozen" for Army, Navy and Lease-Lend use. We don't want to be unduly pessimistic, but you ain't seen nuthin' yet.

● A MEASURE of the value of research is found in almost every aspect of the war. In the food field the work of the Research Laboratory of the Quartermaster Corps has accomplished notable results. Boneless frozen beef furnishes a splendid example, for the Army's beef requirements if shipped as frozen quarters, 1917-1918 style, would need 66,000,000 lb. more freight-carrying capacity. In volume saved (which is vital in marine shipments), the saving in 1942 will amount to 8,300,000 cu. ft. of space.

One way of licking the overseas shipping problem is the foregoing. Another way is the method of concentrating the food by the process of dehydration. This will apply, not only to Army shipments, but to Lease-Lend shipments to a much greater extent.

● BY HIS VETO of the "farm rubber" bill, President Roosevelt disappointed the Farm Chemurgic enthusiasts. Evidently he believes that food should be eaten, not worn out on highways.

● ANYONE can sympathize with the President when he was trying to make sense out of the rubber mess and exclaimed that if there were 57 varieties of pickles, there were 557 varieties of rubber experts. But even the first person to make the figure 57 famous never claimed that there were that many different kinds of pickles.

● WASN'T it just about a year ago when Don Nelson told us that in 1942 the only things to be available in plentiful amounts would be lumber, water and air? Well, scratch out lumber. A manufacturer reports that when he ordered 6 pcs 2x4,14 he was asked for his priority rating.

● FEARFUL that the U. S. public may be weaned away from coffee drinking by the progressive war-necessitated restrictions on importations of coffee, the Pan American Coffee Bureau has begun to promote coffee. The public is being admonished not to eliminate coffee but to use less of it. Peacetime consumption of coffee averages ten cups per week per capita. After the further 10 percent restriction imposed in September, the Coffee Bureau figures that there will still be enough coffee imported into the United States to make eight cups per person per week. The Bureau emphasizes that this is eight cups for every man, woman and child.

This is a very sensible basis for sales promotion of a product where the demand is greater than the supply. Other food manufacturers should take note.

● TREASURY opposition to the Ruml pay-as-you-go tax collection plan appears to be based on the supposition that all good taxpayers are going to die in the same year. What is more likely is that without some such plan most of them may go busted in the same year. You know the rest—blood from a turnip.

Good Men are Scarce

Not long ago a help-wanted ad in a Sunday paper specified a "food chemist experienced in the dehydration of

vegetables; splendid opportunity for right man." You bet! Any food chem-

ist with such experience has a splendid opportunity.

And then there is the case of the chap who recently came into our offices to complain that for the first time in his life he had failed to receive a single reply to an attractive job he offered in *The New York Times*. Ordinarily, he said, he would have received at least 300 letters of application. What's wrong? Nothing, except that good men are scarce. He is only one of six that are looking for such specialists.

Market for Low-grade Dehydrated Foods

A friend has suggested a good use for the off-grade dehydrated foods that, alas, are being produced by firms that lack the know-how and know-why. He proposes that all such rejected material that tastes like hay be stored until the time arrives when we shall have to feed the captured Nazi survivors in what is now Germany.

Not bad—in fact, not half-bad.

Nonessential Industries?

Some indication of the meaning of the word "essential" in connection with the food industries is gradually emerging from various parts of the War Production Board and the Office of Price Administration. At the present time no one attempts to give the final definition, but it is apparent from certain releases that a recent statement from OPA, amending its tire eligibility classification (List A), that alcoholic beverages, soft drinks and similar beverages, confections and candy are not eligible for new or recapped tires.

OPA also denies house-to-house trucks the right to get new tires or recapped tires.

It is easy to see from the foregoing the way the wind blows. And while these are not really official definitions of essentiality or nonessentiality, the pattern of the future shape of things is beginning to emerge.

Birthrate Affects Post War Plans

When accumulating facts, ideas and data about your plans for the future when peace once more reigns, you are advised to include a lot about the birth rate. For the long-time trend of declining birth rate has been sharply reversed. June births were up 3.4 percent over last year, while infant death rate was down 3.2 percent.

Primarily such a trend reversal is of importance to dairies and baby-food producers in the immediate future. But it will have a secondary influence as these youngsters grow up. These kids will not only eat but will be a new market for the products of declining industries whose workers will have augmented employment and will be an improved food market.

War has many strange effects.

More Jobs Cut Consumer Claims

A significant decrease from 2,218 consumer complaints in 1940 to 2,074 in 1941 is reported by a large trade association in the food line. This notable decrease is attributed in part to the greater employment and improved financial status of those who are largely responsible for the complaints. Or, in plain language, it is now easier to make money by working than by scheming. Claims paid amounted, however, to 1.2 percent where litigated, and to 3.2 percent of the total amounts claimed in 238 actions where settlements were made. Suits pending decreased from 330 to 301.

Not to be overlooked, however, is the splendid service of the Index Bureau, maintained by the Association of Casualty and Surety Executives. This bureau helps to identify the "repeaters." Any one who ever files a court action against a food com-

Hors d'Oeuvres

• Faulty exsanguination causes off-quality in meat. That is, it's a bloody mistake.

• *The first ice cream cone was made by rolling a waffle up to hold an ice cream ball. So cones still have waffle-like markings.*

• A story out of London says the morale of the English has been boosted by a rationing scheme which puts candies back into general distribution. So morale marches on—on the stomach.

• *Sales of ice cream increased almost 14 percent during the period January 1 to April 30. Which would seem to indicate that Americans are taking the war in stride.*

• All large stocks of canned beef in the country have been set aside for the armed forces. Well, Herr Goebbels has always maintained that canned bull was an effective instrument of war.

• *"The very waters from which they come proclaim the cooling qualities that are within fish and shellfish," says the Fishery Council. They make no bones about the fact that fish is a good summer food.*

• The bees in Florida are not making as much honey this year as last, sugar shortage or no. Maybe there are some union agitators among the workers.

• *A Southern baker has equipped the front wheels of a delivery truck with tires made of wood blocks. And a reporter says that at 25 miles an hour the truck rode "only a little bumpier than before." Which would seem to be slightly stretching the facts about a rubber substitute.*

• When bread is toasted the heat is said to destroy vitamins at the surface. But don't tell Westbrook Pegler!

• *Though community feeding has been frowned upon in Germany, it was started there last month. So the secret is out. The Germans now know they are at war.*

• From the dairy industry comes the cool comment that during the recent depression ice cream manufacturers dealt in frozen assets and now are selling frozen commodities at frozen prices.

• *By hormone injections, hens can be induced to lay more eggs. In spite of barnyard appearances, the fowl apparently are not contented.*

• Almost a ton of condemned butter recently was sold to a fat renderer to be made into glycerine for use in explosives. In wartime, even lousy quality control can be turned to good purpose.

• *It is estimated that in 1942 one out of seven eggs produced will be dried for shipment to England and far-flung battle fronts. There's something incongruous about eggs being dried for far-flung distribution.*

• In Honduras the United Fruit Co. has offered cash rewards to persons giving information as to the whereabouts of enemy submarines. Something new in the way of soliciting information that will facilitate the distribution of a food.

• *The first printed cookbook was written 463 years ago, not by the accredited author, Platina, but by Martino, a cook. This book shows that the Welsh did not originate Welsh Rabbit nor did the French invent French toast. Italian cuisine was 350 years ahead of the French, and Shakespeare, who studied the Italian Renaissance, knew more about cookery than the experts 200 years after him.—Apparently cuisine is not always what it seems.* F.K.L.

pany is usually indexed here for possible future reference. The purpose of this is not to penalize meritorious claims, but to eliminate the claim racket.

When is a Food Synthetic?

Dairy-farmer opposition to vitamin enrichment of margarine is voiced by an influential western farm journal in this words:

"This (enrichment) was a shrewd effort to choose their own battleground—the one battle front where oleo might shine, because you can put as much synthetic vitamin A in oleo as you wish. You could even take axle grease and doctor it up until it contained more vitamin A than butter."

Asked where synthetic vitamin A could be procured, the farm journal editor has responded (in part): "The vitamin A derived from fish oils, used in oleo, is not a product used in its natural form, as you know, although it comes from a natural source."

Could not a parallel comment be made of butter, cheese, ice cream, evaporated milk or dried milk, which are not used in their natural form as drawn from the cow?

Yours for intellectual honesty.

Women Not Yet Successful as Field Men

In many food companies, where a department head or key man with no understudy is called to military service, his activities are taken over by various individuals so that the vacated job will be open to him on his return. This plan seems to work out best where the volume of company business is somewhat curtailed by the war emergency. Thus nobody is swamped by his added responsibilities.

For jobs other than key jobs, women are taking over with considerable success, except in field work. This is work that involves direct contact with farm producers. Usually the field man is a vital factor in quality-improvement programs. He is an educational force, usually a graduate of his own state college of agriculture after a boyhood on the farm. He knows not only why but how the farmer should do thus and so to produce the desired quality. And he knows farmers and talks their language, and they are at ease with him. These qualifications are all very important factors in the success of any quality-improvement program, be it for milk, cream, pork, poultry, eggs, pickles or apples.

Your state college graduate usually has had considerable military training, for all Land-Grant colleges must have ROTC in return for government funds. Hence such graduates are now promptly grabbed by the military, and the quality-control program based on procurement methods goes fluey unless there are suitable replacements. But nearly all replacements are equally liable to military service.

There is nothing about field work that women can't handle if they have had the equivalent background of farm life and agricultural college training. But, it seems, there are few women who can qualify.

Handle Electrolytic Plate Gently

Electrolytic tinplate, soon to become more commonplace for food containers, is currently held in high esteem because it runs so low in tin—about 0.4 percent. Yet, while it appears to be true that a tin coating of this thinness will protect the food from the base metal of the container, it is reported by some users that it will not withstand rough treatment. If it receives an ordinary bump that would not harm 1.5 percent plate, it is said to expose the steel underneath 0.4 percent plate, thereby setting up certain corrosion problems.

Experience is apparently showing that this new plate requires careful handling around the food plant, handling that is comparable to the care utilized in handling glass. If further experience verifies the earlier reports, it means that material-handling methods must be revamped.

Some Day Aluminum Will Be Plentiful

By the end of 1943 the United States production of aluminum will be approximately 2,100,000,000 lb. per year, which is six and one-half times the 1939 production. How much of the light metal will be available for civilian use after the war is over will depend on a number of factors, not the least of which will be the availability of the aluminum ore, bauxite. But the far-seeing men of industry will be considering the best uses for it when the time comes for more normal ways of life.

Some idea of the enormity of the aluminum manufacturing capacity can be gained from the calculation that 2,100,000,000 lb. of aluminum is sufficient to rebuild every railroad passenger car three times a year. Or this amount could put a 30-piece cooking utensil set into every one of America's 34,000,000 homes, with enough metal left over to make 5,000,000 miles of aluminum electric-power transmission cable.

With a capacity like this the postwar equipment picture may take on aspects little thought of before 1939.

Paraffine Shortage Creates Problems

Paraffine that once was so plentiful is now another item on the list of shortages, and its scarcity will soon create problems aplenty for the food manufacturer. The difficulty is not that the production is less but that demand is so great. Munitions industries are getting increasingly large percentages of the available supply.

Non-food companies, like paint and varnish makers, have already been cut substantially. Chewing gum manufacturers are not allowed any at all. But makers of tents and other canvas military items have been getting huge amounts of paraffine waxes and oils. And every producer of these byproducts of petroleum refining is scraping every tank and doing everything possible to produce more.

The biggest food industry use for paraffine wax is for waterproofing packages and wrapping materials, also for conferring a marked resistance to moisture-vapor transfer. It begins to look as if 1943 will see the paraffine wax problem in an acute stage. Statistically, there will be about 600,000,000 to 700,000,000 lb. available to supply a demand that may run as high as 900,000,000 lb.

Frankly, we are unable to predict who is going to run short but it is obvious that the food industry is not going to get its entire needs if the munitions industry needs it. Hence the wise manufacturer will begin to study possible substitutes before the blow falls. When you begin to write down all the places where the food industry uses paraffine wax the list grows surprisingly large. Space will not permit such a tabulation here.

If frozen food manufacturers are not supplied with their 1943 requirements, it will seriously curtail the pos-

sible volume of perishables to be preserved by freezing. There are, of course, substitutes such as cellophanes of certain types, yet some of these often confer moisture-vapor proofness without possessing the desired proofness against softening by water itself (which is the meaning of waterproofness).

Paper milk bottles, ice cream containers, cheese wrappings, gelatine dessert packages, caramel wrappings, drinking straws, paper cups and a host of other items will be affected.

Dehydrated and Stabilized Butter

Among the new foods under military demand are bread spreads that are often referred to as "dehydrated butter" or "stabilized butter." All have normal butter as their starting point. Some are merely butter oil. Another, "Carter's Spread," is a combination of hydrogenated cottonseed oil and butter. It is said to develop stratification and water separation, like syneresis ("weeping" to you) of jellies, when temperatures fluctuate.

"Army Spread" is supposed to be an all-dairy product, but not much is known about this new development by Kraft Cheese Co. except that it is a combination of cheese and butter.

Hydrogenation is a promising development to produce a high-melting-point butter for tropical use. It is expected to remain plastic at 120 deg. F.

We shall tell you more about these when further information is available.

Licking the Closure Problem

Resourceful bottlers have developed various ways of meeting the restrictions on purchases of crown seals. Used No. 10 cans from hotels and restaurants have provided many a concern with a source of heavy tin-coated sheet (108-lb. stock) from which crowns can be made provided suitable liners are available. In many a region, however, WPB has objected on the ground that old cans must go to detinning plants for recovery of tin and scrap steel.

Some bottlers have gotten back their used crowns by all manner of inducements and are reconditioning them. The chief technical difficulty is that of sterilizing and drying the cork liners. So far, we have heard little about crowns on which state beverage taxes must be paid. Occasionally one hears of a bang-up good reclamation job, involving relining with new cork liners, which is good as long as the cork is available.

Another way of conserving closures is to place them on only large containers, whereby one closure thus does double duty, a method that obviously is possible only where either adjustable filling and crowning lines or large-container lines are available.

Conservation measures are forcing other manufacturers to decide what they can best do with their 70 percent supply (based on previous year's purchases) and is resulting in a noticeable overhaul of sales polices. Long hauls and profitless outlets are being eliminated; likewise, second-string, unbranded lines of goods. Efforts are concentrated on advertised brands where the largest profits lie.

It is significant that relatively few complaints have been raised about the results of enforced curtailment. Yet no on is free from apprehension over the future.

The Agar-Agar Situation

Agar-agar has been under a WPB limitation order for a long time, despite the fact that it is produced domestically in southern California. Importations from Japan, of course, ceased some time ago. But domestic production has gone way down, too, because of the internment of Japanese divers who used to harvest the maroon-red marine alga, *Gelidium cartilagineum*, from which agar-agar is made.

This kelp grows below the low-tide level down to a depth of 60 ft. The Nippos, foxy boys, kept secret the location of our own kelp beds. Now they are interned, and are not telling how to find them. Efforts are being made to rediscover the exact location of the beds, but it is not easy for the Pacific Ocean is fairly large.

Agar-agar is a Malay word, meaning jelly. The product is important to certain meat products, but much more important to bacteriological laboratories. Dairy companies use it in considerable amounts in quality control laboratory work.

This country uses about 600,000 lb. of agar per year. It is not a huge amount, but there is no satisfactory substitute for it in laboratory work, the next best being gelatin, which is not really a substitute because of the lower melting point of its gels.

Best advice is to go very easy on what supply you may have and hope that someone of the Caucasion race soon rediscovers the lost kelp beds, and that Americans can learn to harvest it.

Quality Control In Dehydration Requires Equipment

A certain new corporation ventured into the field of dehydration recently, boldly took a contract that included a penalty clause without knowing whether the plant could really deliver the quality called for, couldn't, or didn't, produce the right quality, and forfeited $0.06 per pound. This sad experience cost the owners more than $10,000 merely for the penalty.

Three facts stand out in considering the episode: (1) The company had employed a competent chemist. (2) Boiler capacity was inadequate, it being impossible to buy a steam generator of suitable size. (3) The plant and process had never been tried out on a full-scale run before the contract was signed.

Lack of steam in adequate amounts made it impossible to do a proper job of processing. Blanching was not thorough. Moisture could not be reduced to proper levels. Production rate was so slow that unit costs were above selling prices.

Without attempting to place the responsibility for the unhappy and costly experience, we take the opportunity to point out that this was a failure of quality control. But no chemist in the world can compensate for lack of adequate facilities. The process may have been a good one, the man in charge of quality control may have been perfect, but the engineering of the process was inadequate.

This incident shows, also, why the inexperienced usually fail to get priority ratings high enough to procure needed equipment.

Quality control is not magic; it is only common sense. Quality control is the procedure of directing action, but it requires something to direct. One cannot steer a stationary vehicle.

As a postscript to the foregoing, we should like to point out that this is a splendid object lesson to professors of food technology for it is FOOD INDUSTRIES' conviction that engineering is just as much a part of food technology as science.

REVOLUTION COMES TO THE FOOD INDUSTRIES

By IVAN C. MILLER
Food Industries, Philadelphia, Pa.

This story of the revolution that is gaining momentum in the food industry is primarily for the owners or presidents of food companies. If it is your job to worry about the future of food distribution in the post war years, you should ponder this analysis

"COMES the revolution, things will be different," as the soapbox orators of Union Square used to say in the good old depression days of 1932. Well, the "revolution" has come to the food industries and things are already different and are going to change some more.

This "revolution" in the food industries began around 1930, when the United States largely lost its export food market. But the changes that began then were slow to take effect, until the war came along to speed things up and cause a first-grade upheaval.

Among the prewar changes back of this "revolution," the following can be listed:

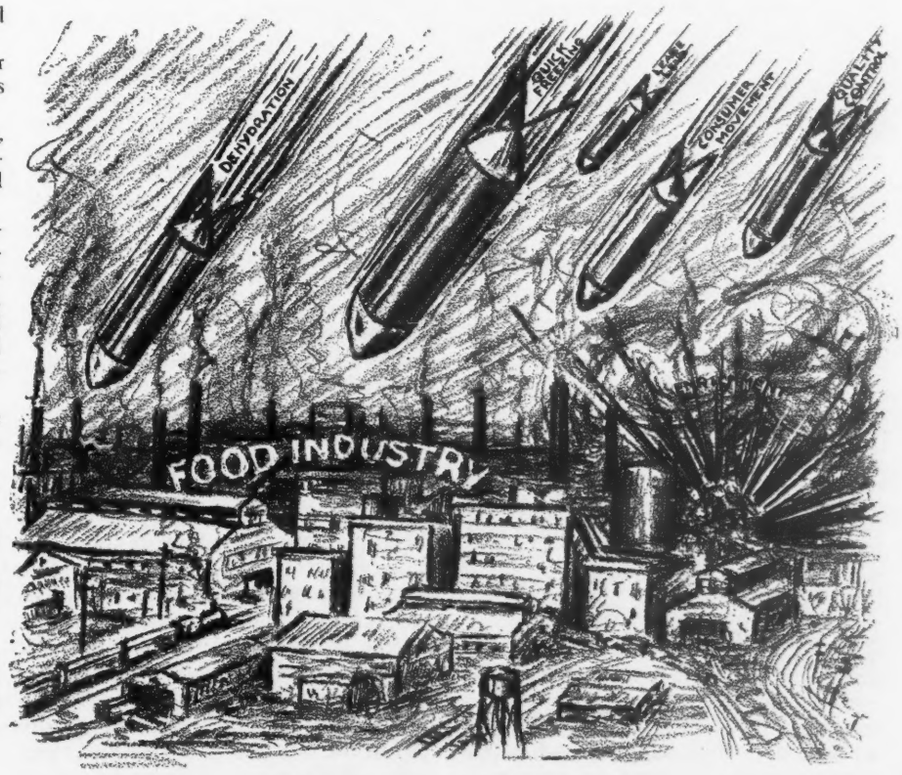
1. Tightening up of federal, state and municipal food laws and regulations.
2. Growth of an organized consumer movement, and of the influence of this movement on government.
3. Establishment of federal standards, grades, and definitions for foods, accompanied by voluntary introduction of federal inspection and grading in food plants.
4. Improved knowledge of nutrition, including the functions of vitamins and minerals in nutrition, and the widespread promotion of this knowledge among consumers.
5. Introduction of vitamin and mineral fortification of foods, and of controlled processing methods devised to retain natural vitamin and mineral content.
6. Discovery and production of synthetic vitamins, making these available in quantity for fortification.
7. Perfection of methods for quick freezing of foods.
8. Beginnings of the development of food dehydration.
9. Improved mechanization of food plants, giving lower costs and better control of quality.
10. Rise of Food Technology as a profession, including establishment of collegiate training courses for food technologists and organization of the Institute of Food Technologists.

From early days the United States was always a large exporter of foodstuffs, primarily of food raw materials. Then, during the First World War, and its immediate aftermath, the export market for processed foods increased. But world-wide depression, the trend toward national self-sufficiency in Europe, and other international factors restricted this market after 1930, with the result that competition in the food industries for the domestic market became increasingly severe.

Out of this competition grew the necessity to cut costs. This started a trend toward mechanization as a means of reducing labor. And this trend, in turn, stimulated the adoption of scientific production methods, laboratory control and quality control in the plant. Such methods demanded the supervision of men with technical training—hence the recent appearance of the food technologist.

At the same time, scientific knowledge of nutrition made great advances and this knowledge spread rapidly among consumers. As a result, tighter governmental control of food processing and distribution, based in large part on consumer agitation, came into effect.

Mechanization, control methods, federal regulation, instrumentation and research brought about the need for the food technologist—and, as the revolutionary trends in the food industries progressed, he continued to gain in importance. Even before the war, the growing ranks of technical men in the field were gaining a prominent place in management. With the war now making increased demands for technical change, food technologists are becoming increasingly necessary to the industry.



Things will never be the same again.

"Kiss the boys goodbye."

Effect of War

Since the outbreak of the war, all these trends have been accelerated. Until then, the revolution in the food industries had been prodded along by competitive requirements and consumer demands. But the war stepped in, with requirements for processed foods for ourselves and our Allies so vast as never before to have been though possible. Where quality and price had been the governing factors, quality and volume now took the center of the stage.

Of course, the pressure was applied first to the farmers, and the food industries were expected to process and preserve all that the farmers could raise. That put still more emphasis on mechanization and technology. It meant expansion of the food industries such as might not have come normally in perhaps twenty-five years.

If that had been all that occurred, there would have been little spectacular about the event. But, along with the necessity to expand output came shortages of tin, rubber, sugar and many other things that made impossible the expansion along customary lines. Not only must greater quantities of food be processed than ever before, but this must be done in unaccustomed ways and the product packed in new or unusual containers.

Effect of Shortages

Consider what happened when tin became short. Tin cans are only available now for a restricted list of foods—those foods that the government considers "essential," and which must be heat sterilized after sealing. Many common foods, including such stand-bys as baked beans, spaghetti, corned-beef hash, and ready-to-serve soups, as "nonessentials," were no longer permitted to be packed in tin. Nonsterilized foods like coffee, baking powder, cocoa and spices were excluded from tin.

Naturally, the makers of such foods turned to glass, already used by many processers of these or similar foods. But only limited relief was available from glass, for two reasons: First, the capacity for manufacturing glass containers is not great enough to substitute for more than a small part of the tin cans formerly used, nor could this capacity be greatly increased under war conditions. And, second, the container must be supplied with a closure, customarily made of tinplate and, where the container contents requires heat sterilizing, provided with a rubber gasket or sealing ring. Both closure and gasket materials are scarce.

Of course, all possible steps have been taken to make the supply of these customary containers go as far as possible to take care of the "essential" foods that are permitted to be packed in them. The weight of tin applied to tinplate by the ordinary hot-dip process was first reduced. Next, electrolytically plated tinplate, carrying greatly reduced quantities of tin, was introduced wherever possible. With glass, in order to reduce the amount of glass in the container, and thus increase glass container output and reduce shipping weight, manufacture was limited to a few standard sizes of "lightweight, shockproof," stock-mold containers, with "private" and fancy mold containers forbidden.

Substitutes Also Scarce

Other limitations on packaging materials also developed to force changes in the food industries. Metal foil is no longer available for packaging, nor is Pliofilm and similar sheet materials. Even cork supplies are strictly limited. Scarcity of cork and rubber for closures also limits the substitution of glass for tin.

For a time it was thought that the development of satisfactory containers and closures made from chemically coated "black plate," that is, plain sheet steel, would solve the container problem. But it turned out that this expedient was only of slight help, as war demands for steel left little "black plate" available for containers or closures.

It is evident from these considerations that a large part of the food processing industries found themselves no longer able to package their products as formerly. Where the product concerned did not need to be heat sterilized in the container, this meant only that the manufacturer needed to develop new packages and packaging methods, using nonscarce materials, that would give proper protection to the food. But where heat sterilization was required, the manufacturer found himself faced with the necessity of abandoning his customary processing methods and adopting new processes with which heat sterilization in the container is not required.

Two methods of processing perishable foods are making rapid advances to fill the gap left by the limitations on heat preservation. One of these is quick freezing and the other is dehydration. Other methods of preservation, including salting, pickling, and preserving in sugar, while still used in approximately as great volume as formerly, for one reason or another are not being pushed as alternatives to canning. Chemical preservation, advocated by some, is blocked because of lack of acceptable preservatives, except in the case of fruit preserved in sulphur dioxide, which is being extensively employed for shipments to Great Britain.

Frozen Foods

The frozen food industry includes cold packing as used to preserve fruits for pie bakers, ice cream makers and jam manufacturers; sharp freezing, employed to extend the storage life of meat, poultry, fish, eggs, and cream; and quick freezing, which preserves fruits, vegetables, meats, sea foods and poultry for

the consumer market in a condition approximating that of the fresh product. Because there is no longer enough tin or glass available to preserve the crops, an increased portion of those that can be quick frozen will be quick frozen, because quick frozen foods can be packaged in paper, of which there is an ample supply.

However, the possible expansion of the quick frozen foods industry is limited by factors over which it has no control. Refrigerating equipment for extension of freezing plants is difficult to obtain because of the priorities situation. Also, there is lack of low-temperature storage space for holding frozen foods until the market can absorb them. And shortage of materials interferes with the construction of new low-temperature storages.

Another factor that prevents quick freezing from taking over much of the load resulting from restriction of canning and glassing is that there can be no great increase in the number of outlets for dispensing frozen foods—unless the present method of distribution is changed. It is unlikely that priorities will permit any great increase in the number of frozen food cabinets in retail stores. If the number of outlets for the retailing of frozen foods is to be measurably increased, some method that does not employ these cabinets must be developed. Distribution might be on a "store-door-day-of-delivery-sale" basis, which is neither impracticable or improbable. Under such a method, stores without refrigerated cabinets would receive bulk deliveries of one or more frozen foods, to be weighed out and sold in consumer-size lots, packed in paper bags and cooked by consumers as soon thereafter as possible. This system has already been tried, apparently with some success, at prices below cabinet prices.

It is evident from the foregoing that, just as customary methods of preservation are restricted by lack of tin and rubber and shortage of glass and cork, quick freezing of foods can only go a short way toward taking up the slack. Dehydration, which also preserves food so that it can be packaged in paper, must be the chief dependence in meeting the new demands on the food industries.

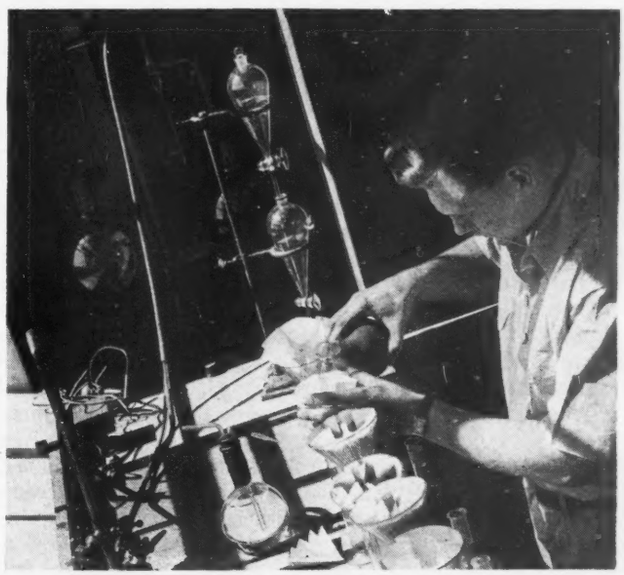
Dehydration Will Bring Changes

Preserving food by dehydration is not new, but, except for a few staple products like dried skim milk, it has been little used until recently. Dried foods, such as fruits, fish, beef and beans, of course, are familiar foods and have been used in large quantities for centuries. These products, however, have considerable residual moisture—in most cases, well over 10 percent. This is too high for satisfactory results with many foods. In contrast, the dehydrated foods here referred to are dried to a moisture content of 5 percent or less.

Since the outbreak of the present war, the dehydration of food has increased at a rapidly accelerating rate. Already, huge quantities of milk and eggs are being prepared in this manner and small, but increasing, quantities of dehydrated vegetables and meats are being produced.

Had it not been for the war, dehydration would probably have developed into an important method of food preservation, as evidenced by the increasing popularity of dehydrated soups and soup mixes, but its general adoption would have required many years. Now, thanks to the war and necessities stemming from it, dehydration promises to become one of the leading methods of food preservation in the short space of two or three years.

And when this happens, the full force of the revolution will be felt in the food industries. The new industry must be fully controlled by food technologists if it is to be the success that necessity demands, for it has no long history of slow development by trial and error methods behind it, as is the case with all other food preservation methods except quick freezing. To be salable, a dehydrated food must retain both the flavor and the nutritive values of the original unprocessed food for a reasonable length of time. And this can only be done when the product is processed and packaged under complete technical control. Because this control is necessary and because dehydration will be utilized in practically every branch of food manufacture, its full adoption means the final emergence of the food technologist as the most important factor in the food industries.



The quality control and research work of the food technologist are important factors in the "revolution" that has come to the food industries.

Distribution Affected

Dehydration will not only revolutionize food processing and the control of food processing—it will also revolutionize food distribution. Consider the matters of weight and bulk. The greater part of most foods is water. Dehydration removes all but 3 to 5 percent of this water. The resulting product varies in weight from one-quarter all the way down to only one-twentieth of the weight of the original food. And by dehydration, its bulk is reduced by one-half or three-quarters. And, if compressed after dehydrating, the processed food may have only 5 to 10 percent of the bulk of the original. This reduction in weight and bulk is already revolutionizing food transportation—witness the freighting of dried foods in airplanes as a war measure.

Consider next the effect of the dehydration of foods that have been largely distributed as perishables—milk, eggs and meats, for example. Dried whole milk powder that will keep for long periods without flavor change has already been made. When this product is available in abundance, the whole complex structure built up around the pasteurization and delivery of fresh milk in cities will be obsolete. Dehydrated meats that will keep and that, when cooked, cannot be distinguished from the fresh product have already been produced. When production of these reaches quantity, much of the elaborate structure built up for the wholesale and retail distribution of highly perishable fresh meats will be obsolete. Similar effects will be felt in the distribution of other perishable products such as eggs, fruits and vegetables. There is even the possibility that flour will be dehydrated and pressed into briquets, to cut down its weight and bulk for long distance shipments; while, already, butter is being dehydrated in New Zealand.

Only brief consideration of these changes is necessary to confirm the opinion that the food industries are being rapidly revolutionized. They will emerge from the war period with the food technologist in firm control and processing and distribution greatly changed.

ENGLAND CONCENTRATES FOOD MANUFACTURING

Fewer factories allowed to process foods, yet nucleus is kept alive for postwar days. United States is considering similar policy. (A report based on official information from the British Ministry of Food)

WHAT has happened to British food industries under the wartime policy of conversion and concentration provides a fairly clear pattern of what is likely to occur in the United States as our war effort is accelerated.

Conversion of all sorts of manufacturing establishments from peaceful trades to production of materials of war has been going on in the United States since early in the spring of 1942. England began to convert shortly after Dunkirk, thereby gaining almost a two-year head start on us.

Conversion to war production in England has not, however, provided enough manufacturing facilities for the war industries. Unfortunately, many peacetime industries could not convert. Their equipment was not adapted to war production. Their export markets were cut off and imported raw materials were seriously curtailed by shipping shortages. Domestic purchases were also reduced by rationing, tremendously higher taxes and scarcities of many materials. Thus, many a factory was operating at less than capacity on peace goods while Britain needed many more war-goods factories. This has led to a policy of concentrating all production for civilian goods in fewer factories, thereby releasing much needed space and personnel for war work. Even food processing industries are being concentrated.

Britain's problems are aggravated by the destructive effects of bombings but differ from U. S. problems in the greater dependence on British importations of raw materials. Engaged in a war for her very existence, she has been forced to drastic measures which seem likely to be repeated here to only a slightly lesser degree. While it has been a cardinal principle of the British Food Ministry's policy that nobody shall be put out of business through concentration of industries unless their premises or manpower are required for other essential purposes, it is true that many food establishments have been closed.

The record of such closures that have already been accomplished is a grim reminder to U. S. food manufacturers of the realities of total war: 17 out of 22 British "cheese processing" factories are closed, 30 out of 40 "compound lard" plants, 140 out of 200 edible fat melting plants, and 13 out of 33 margarine plants. A number of the margarine plants are, however, being retained as standby plants on a "care and maintenance basis," in case of emergencies. Seven seed crushers are also closed.

The food plant concentration policy is still being carried out, and it is expected that concentration of production in fewer plants will release considerable space to other uses. Biscuit manufacture is expected to release 25 percent of its space, soft drinks will also give up about 25 percent, bacon curers will lose 30 percent and chocolate and "sugar confectionery" industries will give up 30 percent.

All space released by these concentration schemes is handed over to the British Board of Trade, which acts as a clearing house for supplying all government needs for factory or storage space.

Concentration of carbonated beverages is based on the policy of maintaining the output of soft drinks by distribution of flavoring sirups but reducing the bottled output. Shortages of closures admittedly has been one of the factors in this decision.

Decisions relative to reduction of output, concentration and the like are seldom the result of absolute shortage of a particular ingredient but rather of the stringency of shipping, inland transportation or the need for factory space or manpower. The degree of essentiality of of each product is considered in the foregoing light. Unessential or luxury products, being extravagant of manpower, packaging materials, fuel and power, are either eliminated or reduced.

For those products largest in tonnage —flour, cakes, sweet goods and biscuits —the maintenance of output in quantity at the expense of some reduction in quality and range of items is permitted through unrestricted supplies of flour—although sugar has been cut to 60 percent and edible fats to 80 percent of prewar usage. Biscuit production is now some 6 percent above prewar levels.

Sugar and chocolate confectionery output has been reduced to about 65 percent of prewar levels by reduced allocations of ingredients. This will release over 10,000 employees and 2,000,000 sq. ft. of space.

Despite the increase in total production of the biscuit industry, concentration will release 2,000 employees and 900,000 sq. ft. of space.

Other food industries to be concentrated are those manufacturing pickles, sauces, starch and food powders. (Certain butter and cheese plants did not open in 1942.)

On the list for review and study to learn if concentration should be done are the following: Corn sugar, sausage, "open meat pack," gut cleaning, tripe dressing, cider and spice grinding.

"Concentration Formula"

In arriving at decisions relative to concentrating an industry, a sort of "concentration formula" has been developed which has two main features. In the first place, "a list of all the factories in the industry is supplied to the Ministry of Labor and the Board of Trade, who are asked to indicate those whose labor and space would be required for other essential purposes. Arrangements are then made for the discontinuance of production in such of the selected factories (or suitable alternatives) as can be given up without prejudice to the total output required from the industry as a whole. This is regarded as the initial contribution to be made by the industry, and its great importance lies in the fact that it releases whole factories and appreciable blocks of labor in the areas where they are most urgently needed."

The second feature which results in a further release of labor and space "takes the form of an announcement to the industry that from a specified date, no protection will be afforded to labor employed in excess of a prescribed number of operatives per ton of output. This figure is determined by results achieved by the most efficient firms in the industry, and is fixed at such a level as will inevitably mean the employment of the permitted labor only on the most economically produced lines. For ex-

(*Turn to page* 106)

Tunnel Dehydraters And Their Use in Vegetable Dehydration

By W. B. VAN ARSDEL

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PART I—Factors governing the choice of a dehydrater for vegetables and various available arrangements of tunnel dehydraters, are discussed in this article,* the first of three papers in which the author will discuss the engineering of dehydration.

As a result of the current rapid expansion of the vegetable dehydration industry, many canners and other food processors have been faced with the problem of learning the elements of an unfamiliar technology almost overnight. More and more operators find themselves confronted with the sudden necessity of selecting a dryer from a number of fundamentally different types; and then, having made a selection, learning to operate this particular dryer. Too often, the limitations of the equipment become apparent only after a considerable investment of time and money has been made.

The purpose of this series of articles is to present, first of all, a statement of the criteria that are now believed to give a rational basis for choice of one or another type of dehydrater, and second, to describe the operating characteristics of just one of these types—the continuous tunnel. The physical and engineering fundamentals of dehydration are discussed only so far as is necessary to explain the methods used in arriving at the more practical conclusions. The reader who wishes to pursue further some aspect of the subject is referred to the bibliography at the end of this section.

What Determines Choice of a Dehydrater?

Deciding upon the kind of vegetable dehydrater to be built or purchased is a complex problem. There are many considerations which deserve careful analysis. Some of them might be stated in the form of the following questions:

What is to be the form of the product (strips, flakes, powder, etc.)?
What vegetables are to be dried?
What is to be the scale of operations?
Is the plant to be organized to work substantially 24 hours per day?
Will operation be changed frequently from one product to another?
How dry must the product be?
Are nuisance odors (onions, etc.) likely to be a problem?
What facilities will there be for disposal of plant wastes?
Does the operating crew need to be highly skilled, and are technically trained supervisors available?
How much ground-space will be available?
Can construction be undertaken locally?
How permanent is the dehydrater to be?
What is the relative importance of low capital cost and low operating cost?
What items of materials and equipment that might be needed are on hand?
What is the aim with regard to quality of product?

1. **Form of product.** If the product must be in the form of *pieces*—strips, shreds, cubes, slices—then only a tray dryer (continuous or batch) or a continuous belt dryer can be considered. Thin flakes are best produced on a drum dryer. Powder may be made by spray drying, or by grinding the product of a tray, belt, rotary or drum dryer.

2. **What vegetables?** Market demands and availability of supplies will determine what vegetables should be dried. That, in turn, will partly determine what dehydrater can be used.

Tomatoes are difficult to dry in the form of slices; they are usually pureed and either drum dried or spray dried. Very few blanched vegetables will stand the tumbling that takes place in a rotary dryer without breaking up. Onions and some varieties of cabbage require so low a finishing temperature that a special finishing dryer should be considered.

3. **How big a plant?** An operation which is to handle less than about 10 tons of fresh vegetable per day will be

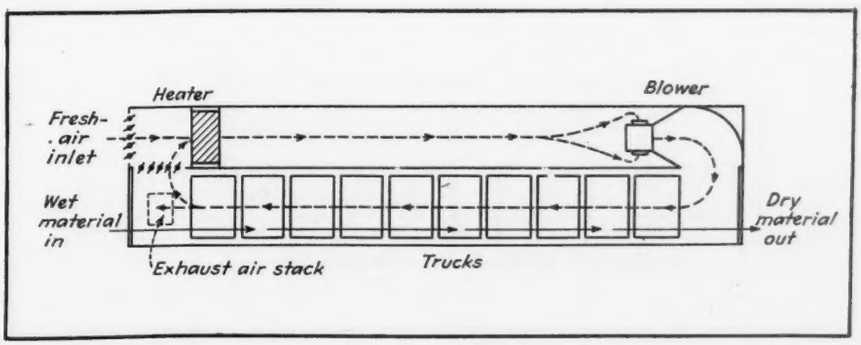

FIG. 1. Counter-current air circulation in a tunnel dehydrater, employing a single blower and heater.

* Contribution of the Dehydration Committee, Bureau of Agricultural Chemistry and Engineering, United States Department of Agriculture.

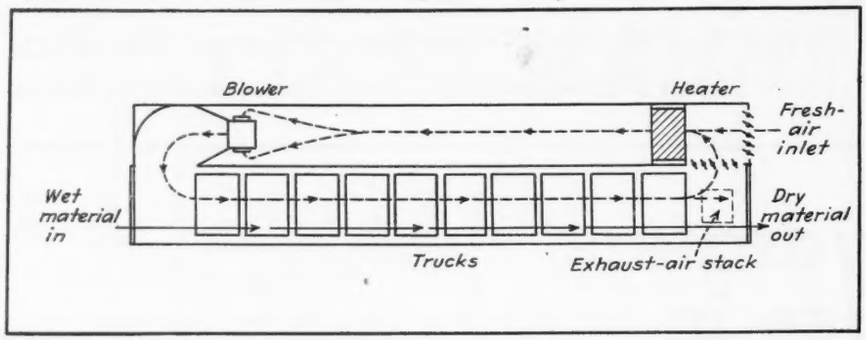

FIG. 2. Parallel-current air circulation in a tunnel dehydrater, employing a single blower and heater.

served better by a group of batch dehydraters than by a continuous dehydrater. A plant handling 40 tons or more per day is likely to find one or more continuous dehydraters more practical.

4. **Length of day.** A continuous dehydrater should run without shutdowns for long periods of time, and therefore, since prepared vegetables must be dehydrated promptly, it requires a preparation line which works substantially 24 hours per day. If preparation must be confined to only one or two shifts, batch dehydraters should be chosen.

5. **Flexibility of operation.** The continuous dehydrater is best adapted to an operation for a long period of time on a single product. Since every run in a batch dehydrater is an independent operation, a group of cabinets is highly flexible in its ability to handle diverse products. Certain types of sectionalized continuous dryers share this characteristic to some degree. Any dehydrater, however, is most efficient in operation on one particular product, and flexibility of operation can be gained only at the sacrifice of some efficiency. In general, a good fruit dehydrater is a wasteful vegetable dehydrater, and vice versa. Fortunately, vegetables as a group are sufficiently similar in drying properties so that a composite design having reasonably good characteristics is possible.

6. **Moisture content of product.** The present government purchasing specifications require products to be dried to a very low residual moisture, corresponding in most cases to relative humidities of 20 to 30 percent, and it is possible that even lower values may be required in the interest of improved storage life. The present standards cannot be practically attained in a continuous dehydrater running parallel current (see below), and are close to the limit of ready realization in an ordinary batch dehydrater, or counter-current, or center-exhaust continuous dehydrater. If substantially lower moisture should be required, special finishing dryers (vacuum or desiccated air) will be needed, and the primary dryer should be modified correspondingly.

7. **Nuisance odors.** If the escape of pungent odors must be prevented, a vacuum dehydrater may be favored, or the somewhat unusual type of hot-air dehydrater which reuses the same air over and over, dehumidifying it at some point in the circuit. One alternative is to pass the exhaust air through an activated-carbon tower or chamber, and thus hold back the objectionable odor.

8. **Waste disposal.** Vegetable preparation wastes must be removed from a plant promptly and thoroughly in order to maintain sanitary conditions. Solid wastes, which may be handled as garbage, usually present no problem, but wastes from peeling and washing starchy vegetables are in suspension in water and must be classed as sewage. If sewage-disposal facilities are limited or absent, the plant may be severely restricted in size, or may have to forego any attempt to dehydrate such vegetables. Indirectly, then, adequacy of sewage handling facilities will have a bearing on the selection of a dehydrater.

9. **Competence of operators.** The parallel-current and counter-current continuous dehydraters are the simplest to operate and supervise. Center-exhaust designs are more complex, and call for the exercise of more judgment by the operator. Batch-type dehydraters require careful attention by the operator, or fairly elaborate automatic controls.

10. **Ground space.** A rough average of the space required for a dehydrater is 50 to 100 sq. ft. per daily ton of capacity (one ton of fresh, unprepared vegetable per 24 hours). The smaller figure is likely to characterize a large plant. This area includes an allowance of room to handle the product into and out of the dehydrater.

11. **Local construction.** If competent construction talent is available locally, simple tunnels or cabinets can be built where they are to be used. A considerable saving in first cost, as compared with the cost of a complete "ready-made" dehydrater, is likely to be effected. The U. S. Department of Agriculture is prepared to furnish to qualified inquirers the construction drawings and specifications of several different designs which can be built by any competent industrial contractor. The first cost of such units will usually be within the range of $400 to $1,000 per daily ton of capacity. Actual cost will depend upon the type chosen and the degree of elaboration.

12. **Permanence of installation.** A dehydrater built primarily as emergency equipment is likely to lack some refinements which would be desired in a permanent unit. It would appear to be good judgment for an organization which is new and inexperienced in the field to build first a relatively small unit of the "emergency" type, and to let experience dictate the refinements which should be incorporated in additional units. Not even an emergency plant, however, should be planned for an expected life of less than ten years.

13. **Capital cost vs. operating cost.** The relative importance of low first cost and low operating cost may be the factor which decides between a continuous belt dehydrater and a tunnel-and-truck unit; between manual control and automatic

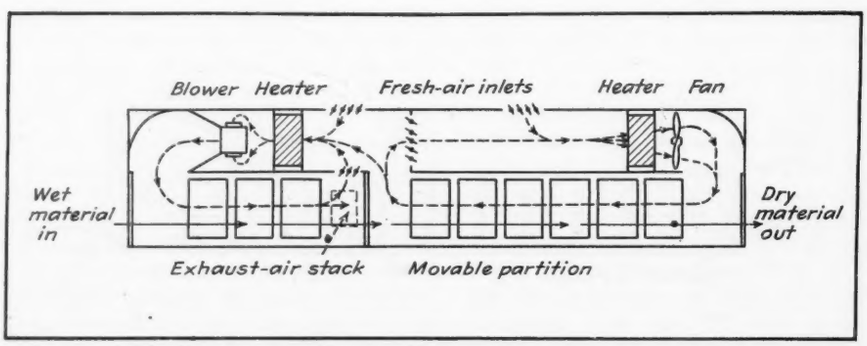

FIG. 3. The center-exhaust type of tunnel dehydrater may employ two blowers and two heaters, as shown here, or may be designed as shown in Fig. 4.

temperature-cycle control of a cabinet; or between a single large unit and a more flexible group of smaller units. In all but the smallest plants, continuous dehydraters cost less to build and operate than batch dehydraters of the same drying capacity.

14. Materials and equipment on hand. Under wartime conditions, the type of plant may well be determined by the availability of certain motors, blowers, heaters, or sheet and structural steel, which will suit one design much better than others. Fortunately, there is no one "best" type of dehydrater; there is enough room for freedom of choice so that much stress can be laid on this matter of availability of equipment. For example, the existence of large unused steam-generating capacity should be considered a windfall of the first magnitude, especially if gas is not available as an economic fuel. From 4 to 10 boiler horsepower of boiler capacity is required to heat a dehydrater per daily ton of vegetable dehydrated; within this range, continuous dehydraters have a lower peak demand for steam than batch dehydraters of the same 24-hour capacity.

15. Product quality. Experimental tests and commercial experience both testify to the fact that the drying procedure has substantial effects upon the quality of the dehydrated product. Choice of a vacuum-drying process is generally advocated on the basis of quality improvement alone. Some commercial concerns, commendably jealous of the quality of their products, regard the exact procedures and equipment used in their plants as valuable business secrets.

Evaluating Dehydraters

Claims and counterclaims made on the basis of the relatively intangible factor of product quality are perhaps the most difficult of all for the newcomer in the field to evaluate. In fact, if he analyzes the situation carefully he finds he must appraise at least these considerations: (A) Government purchasing specifications are written broadly enough to admit the products of simple, well-known, hot-air drying processes; shall he try to develop a premium grade market and take a chance that higher costs may shut him out of competition on present government purchases? (B) What price differentials may he hope to command, at various volumes of output, if he chooses to try the premium market? (C) What are the chances that the government specifications will become more exacting? (D) If he decides on the specialized plant, what assurance has he that he can secure the necessary priorities for restricted materials and equipment, and can count on reasonably prompt delivery?

Any attempt to analyze such questions would go beyond the scope of this article, but there are a few general principals which may aid those who wish to attempt their own analysis. For example: (A) Rapid drying favors maximum retention of vitamins, flavor and color. (B) The favorable effect is enhanced if the rapid drying can be combined with relatively low temperature and low oxygen concentration. (C) There is no virtue in any process, vacuum or other, which results in overheating the product at any stage of drying. (D) Any drying process which diminishes the degree of shrinkage of the product is likely to improve the ease with which the product can be "reconstituted" for use, but this advantage may be more than offset by the increased bulkiness of the product, especially if it is destined for overseas shipment. (E) The favorable effects of rapid drying and relatively low temperature may be substantially realized in hot-air dehydraters through careful design and operation, but usually the improvement is accompanied by a somewhat higher operating cost. A detailed analysis of these elements of design and operation of a continuous tunnel dehydrater is given in a later section of this series of articles.

Besides these specific factors, there is a general psychological factor that is far from unimportant. It may be stated in this way: "How good a gambler are you?" Some of the more advanced designs promise substantial improvements in operation, but they have yet to be tested in practice. The technology of dehydration is still so new that there is no well-established pattern of safety and sanity to which the ultraconservative can turn. Every man must decide for himself just how much of a pioneer he can afford to be.

The Tunnel-and-truck Dehydrater

The most important conclusion of the foregoing paragraphs is that a dehydrater should be chosen only after careful analysis of the specific circumstances in which it will be used. While generalizations are correspondingly dangerous, it may be said with some confidence that the following kind of situation favors the installation of a tunnel-and-truck dehydrater: The operation is a relatively large one, handling at least 10 tons, and preferably 30 or 40 tons, of fresh vegetable per day; such vegetables as potatoes, cabbage or carrots are to be dried in strips, shreds or slices, primarily to fill government contracts; the preparation line can work substantially 24 hours per day; it is anticipated that the plant will work exclusively on one vegetable for at least several months; few, if any, of the operators will be technically trained or have any previous experience in operating a dehydrater; ample ground space and competent local construction contractors are available; the postwar market is thought to be problematical, so capital cost is to be held to a minimum without unduly increasing operating cost; only the bare essentials in restricted materials and equipment will be used in the plant.

It will be recognized that this summarizes a very common situation. As might be expected, a large proportion of the plants which are now carrying the major part of the dehydrated-vegetable production use simple forms of tunnel dehydraters. This current practical importance of tunnel dehydraters is thought to be sufficient justification for the detailed analysis which will follow in later installments of this series.

General Features of Tunnel Dehydraters

The tunnel-and-truck dehydrater is essentially a forced circulation, hot-air dryer, arranged so that the moist material, spread on trays so as to expose a large drying surface, may be carried in semi-continuous flow through the equipment and emerge substantially dry. The distinction from the continuous apron,

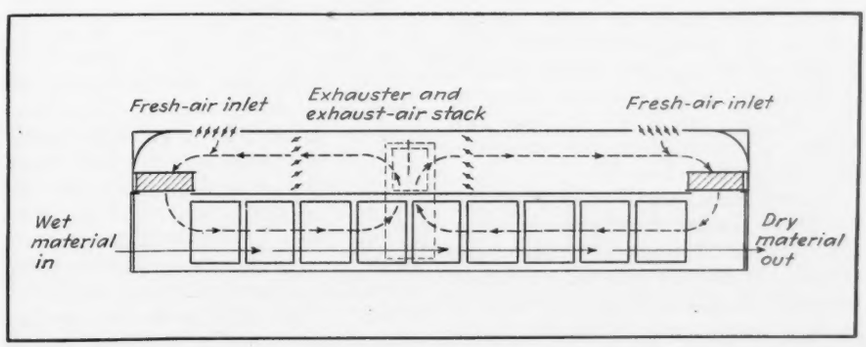

FIG. 4. In this center-exhaust tunnel, air circulation is obtained by means of a single exhauster, but two heaters are needed.

or belt, dryer lies only in the fact that the moist material progresses through the equipment a step at a time, and remains stationary between steps; in tunnels of the usual lengths the difference in effect is so slight that the equipment may be analyzed mathematically as though it were truly continuous.

The tunnel is essentially an enclosed passage through which heated air can be circulated, and through which at the same time wheeled trucks, carrying the moist material spread on trays, can be conveyed. Tightly fitting doors at the ends of the tunnel allow a truckload of dried material to be withdrawn periodically and a fresh truck of moist material to be introduced at the other end. The number of trucks accommodated in the tunnel at once varies in different designs from as few as six to as many as fifteen or more. One or more blowers or propellers, and equipment for heating the circulating air, are arranged in various fashions outside of the tunnel proper.

In large plants it is usual to install several tunnels of moderate size side by side, rather than to increase the size of a single tunnel. In such multiple arrangements a single blower and heater frequently is made to serve two or more tunnels at once.

A modification of the usual design dispenses with wheeled trucks, and uses instead fixed ledges or slides on the walls of the tunnel, so that trays may be pushed through the tunnel directly. If the tunnel is given a slight slope, so that the trays almost slide by their own weight, the arrangement is sometimes called a "gravity" tunnel.

In commercial installations, a substantial proportion of the drying air is usually recirculated through the heater and reused. While this measure is designed primarily to improve heat economy, it is also a simple way to increase the average humidity in the tunnel—an expedient which tends to prevent the occurrence of "case-hardening." The functions and effects of air recirculation will be analyzed in a later section of these articles. "Case-hardening," which means only that drying of the center of a piece may be hindered if the outside layers are dried too rapidly, is troublesome in the dehydration of fruits, but has only minor importance in the dehydration of vegetables.

Arrangements of Air Circulation

Many different arrangements of the air circulation in tunnel dehydraters have been proposed, and several different systems are widely used. These differences in arrangement may lead not only to widely varying constructional designs, but also to considerable differences in capacity, efficiency and ease or difficulty of control. The accompanying diagrams illustrate some of the more important arrangements.

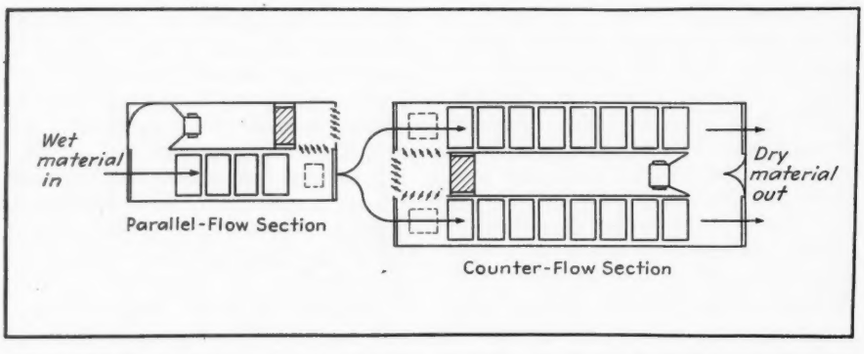

FIG. 5. Multiple-section tunnel dehydraters may consist of a first section having parallel air flow and a section with counter-current air flow.

Counter-current. See Fig. 1. Fresh air, mixed with some recirculated air, is heated to the maximum temperature to which the dry product may be exposed without damage, is blown through the tunnel from the "dry end," and is partially exhausted, cooler and moister, from the "wet end." This arrangement is typical of prune and raisin dehydraters widely used in California, and has been applied with success to many vegetable dehydraters.

Parallel current. See Fig. 2. Construction is similar to that of a counter-current tunnel, but the flow of air is reversed, so that the hot air enters the "wet end" of the tunnel. The allowable air temperature is generally higher than in a counter-current tunnel, since in the wet end of the tunnel the temperature of the product will be little, if any, above the *wet-bulb* temperature of the air. In the dry end, however, the air will be relatively cool and moist, and it will be impossible to dry the product completely except at very low rates of loading the tunnel.

Air supply at both ends, exhaust at center. Two arrangements are possible, illustrated in Figs. 3 and 4. In both of them, warm air is supplied to *both* ends of the tunnel, and is exhausted at, or near, the center. Moist material therefore travels "parallel" with the air current in the wet end, and "counter" in the dry end. In the arrangement sketched in Fig. 3, separate blowers and heaters are used in the two ends;[a] in Fig. 4, a single blower, working as an exhauster, draws air into both ends.

Multiple section. See Fig. 5. Two or more tunnel sections are controlled independently as to temperature and air flow. An especially promising arrangement of this kind combines a relatively short parallel-flow tunnel, acting as the first stage, with two or more counter-current finishing tunnels. The utility of such an arrangement arises from the fact that from 75 to 90 percent of the original water content of a vegetable will evaporate very rapidly, but the remainder requires a relatively long time.

Air supply at center, exhaust at both ends. (Not illustrated.) A considerable number of fruit drying tunnels have been built in this manner, which is "center intake," the reverse of "center exhaust." The product travels "counter" to the air in the wet end, and "parallel" in the dry end. In one design for a tunnel with this kind of air flow, the tunnel contains only six trucks; incoming warm air flows transversely through the two center trucks, divides, and each branch of the air stream returns transversely through the two trucks at an end of the tunnel.

Combination compartment and tunnel. (Not illustrated.) Air-flow is transverse to the axis of the tunnel, in a back-and-forth flow through successive trucks. The general direction of flow may be counter current, parallel current, or any desired combination—for example, center exhaust. In this kind of tunnel, air circulation is frequently secured by a propeller-type fan at each compartment, and additional heaters may also be used at each stage. The number of "degrees of freedom" of such a dehydrater as this makes it a very flexible instrument, but a complex one to build, control and operate.

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(*Turn to page 106*)

Swift Puts Meat Dehydration On a Production Basis

By E. S. STATELER,
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Packer uses coarse and fine grinding with precooking, controlled temperatures, continuous operation, compressing and airtight packaging in filling Federal contract for 80,000 lb. of dehydrated beef

STIMULATED by the award of a Federal contract on July 30 for 80,000 lb. of dehydrated beef, Swift & Co. has expanded its experimental pilot-plant meat dehydration activity to industrial proportions and put it on a continuous operating basis.

Availability of production equipment is playing a dominant rôle in the industrialization of meat dehydration and is an important factor in determining what companies can start commercial operations. Since government plans call for at least ten meat dehydration plants, a bank of strategic construction materials has been set up for that particular purpose.

The unit used by Swift & Co. makes use of a rotating-drum dryer with heated air discharged through louvre-like vents into the drying chamber. During the dehydrating treatment in this unit, heated air is forced through the meat mass to maintain a granular structure in the final product and to give a sweeping-out movement to the moisture-laden vapor, resulting in dehydrated beef with less than a 10 percent moisture content.

Details of the method used by Swift & Co. are the result of months of experimental work by H. H. McKee and associates of the general superintendent's office and of Link-Belt Co. engineers. They hinge on positive control over all operations and processing from the selection of the fresh beef to the packaging of the finished product.

An accompanying sketch (Fig. 1), illustrates the various steps in the procedure and indicates the need for synchronization of the various mechanical units to maintain the necessary control over the temperature and time cycles of the treatment. The most essential factors in the procedure are to keep temperature variations within well-defined limits, to hold opportunity for bacterial development to the minimum, and at the same time to retain to the maximum the nutritional qualities of the meat.

As in the production of all dehydrated foods, the finished dehydrated meat cannot be of any higher quality than the fresh raw material. For that reason the first steps in the Swift & Co. method, and as specified by Agricultural Marketing Service, are the selection of whole carcass beef to be dehydrated, the removal of all bones, tendons, heavy blood vessels and fat in excess of 10 per cent, and the holding of the meat under continuous refrigeration.

The Process

From the refrigerated storage the fresh beef is conveyed to a rotary meat cutter to be divided into approximately 2-in. cubes before being dropped into an open, steam - jacketed cooking kettle. The kettle is fitted with a revolving vertical paddle agitator, has a cooking capacity of 1,500 lb. of chopped meat and operates under a steam pressure of 3 to 10 lb. A battery of four kettles is needed to supply one rotary drum dryer with a production capacity of 1,000 lb. of dehydrated beef per hour.

With the addition of barely enough water to prevent sticking to the kettle walls, the beef cubes are precooked at not lower than 165 nor higher than 175 deg. F. with constant agitation. After a cooking period of not less than 30 minutes to inactivate the meat enzymes, to absorb added water, to reduce total water content of the beef from about 72 to about 50 percent, and to coagulate the heat-labile meat juices, the contents of the kettle are dropped through a gate valve into a steam-jacketed receiving hopper over the horizontal flight of a helical conveyor. This conveyor feeds into an elevating helical conveyor discharging into the hopper of a fine grinder or hasher which empties into the dryer.

Hashed to a particle size of ⅛-in. cubes and at a temperature of approximately 155 deg. F., the partially cooked beef feeds directly from the grinder into the rotating drum (Fig. 5)

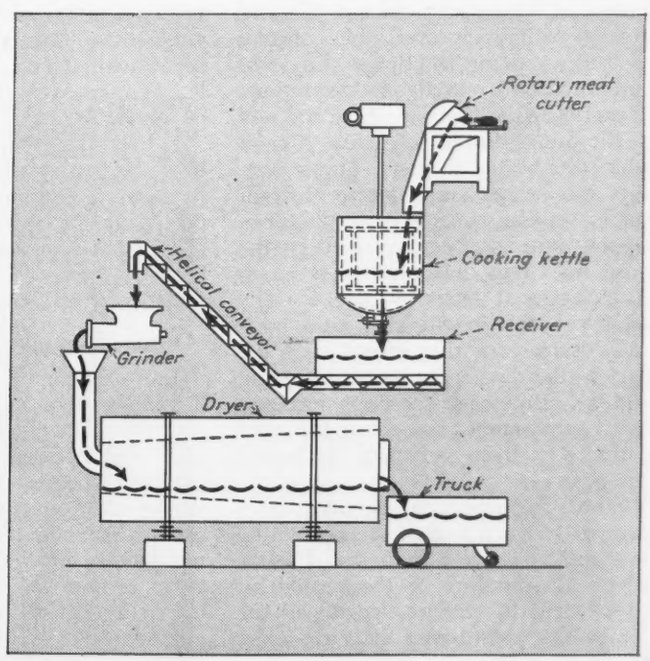


FIG. 1. From this diagrammatic layout of the production line for dehydrating beef the relation of each operation and processing unit to the others can be visualized.

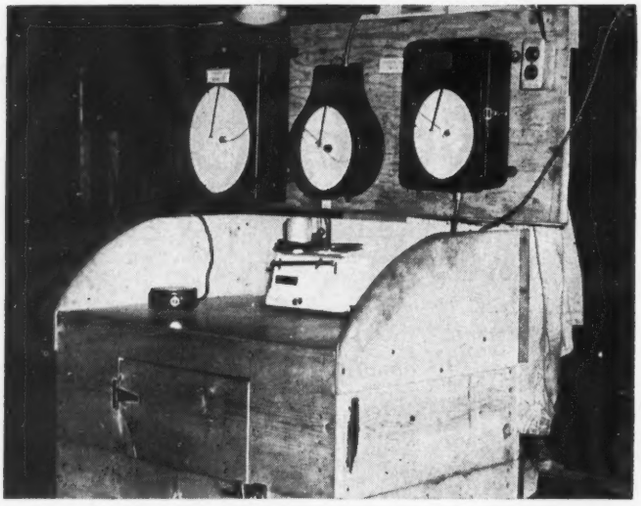


FIG. 2. Continuous production details were developed on a pilot-plant scale with the aid of temperature-recording instruments. One of the three recorders shown here is connected to the feed end of the rotary drum dryer and the other two are connected to stations inside the drum.

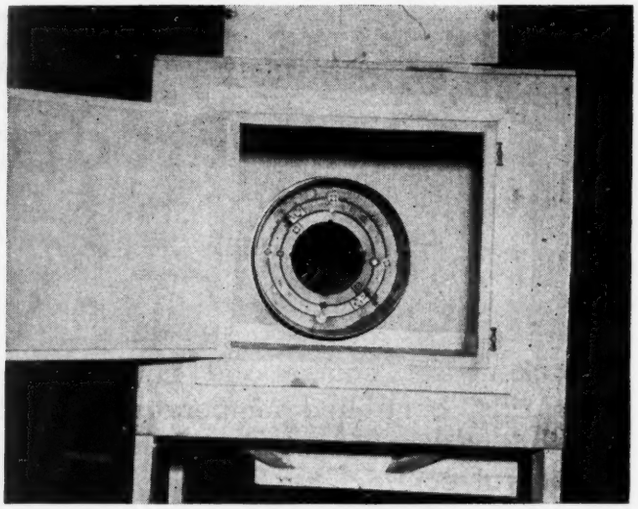


FIG. 3. Although the discharge end of the rotary drum dryer has a larger diameter than the feed end, the actual discharge opening is constricted to retard spilling out of the granular, dehydrated beef until it has been in contact with the heated air for a predetermined length of time.

of the horizontal dryer, where air heated to about 300 deg. F. is forced at a velocity of approximately 800 ft. per minute through the bed of meat. To speed up the removal of water vapor and to aid in keeping the meat in a relatively fine state of division, the heated air is directed through the tumbling meat mass by louvre-like vents as it moves lengthwise of the rotating drum to the discharge end.

Dehydrating Unit

In construction (Fig. 4), the inner surface of the rotating drum consists of a series of partially overlapping shelves or baffles running lengthwise the drum and fastened on one edge to longitudinal bars attached at right angles to the wall of the drum, forming channels through which the heated air flows. Under pressure the heated air is forced through the louvre-like spaces between the overlapping inner surfaces and through the meat mass into the drum, from which it discharges at about 150 deg. F. The width of the longitudinal bars gradually decreases as they extend from the feed to the discharge end of the drum, and the diameter of the drum increases to give maximum exposure of the meat particles to drying action of the heated air.

Since the direction of rotation is counter to the direction of slope of the overlapping surfaces from the attached edges, the pressure of the heated air is sufficient to prevent clogging of the louvre-like vents during the early stages of the moisture-vapor removal.

During the dehydrating operation the temperatures are kept within the predetermined limits by power-regulator controls on the steam feed valves. Also, the volume flow of heated air through the rotary drum is under mechanical control.

By the time the meat reaches the discharge end of the drum, and after 2 hours of drying, it has been kept definitely granular in form and has become free flowing in action with a residual moisture content of not to exceed 10 percent. The slope of the rotating drum and the mechanical construction of the discharge end (Fig. 3) are such that the dehydrated meat slowly spills out into a sanitary, metal, wheeled receiver for transfer to the packaging department at a production rate of 1,000 lb. per hour for a dryer with a diameter of 7 ft. 11 in. and a 24-ft. length.

When the commercial installation has been completed, when all operations have been simplified, and when all processing steps are synchronized, the anticipated elapsed time from fresh boneless beef to the packaged, dehydrated product is set at about 5 hours.

Great Saving in Shipping Space

In this granular state the meat occupies less than half the space it did in its fresh, boneless state and about one-sixth that necessary for the equivalent weight of beef in carcass form. Since the objective of meat dehydration is to get the maximum nutritive value of animal protein into the minimum shipping space, compressing the dehydrated meat is practiced in the packaging operation.

Under a pressure of about 2,000 lb. per square inch the dehydrated meat is forced into airtight containers and sealed under a 22-in. vacuum for export shipment. Compressed dehydrated beef

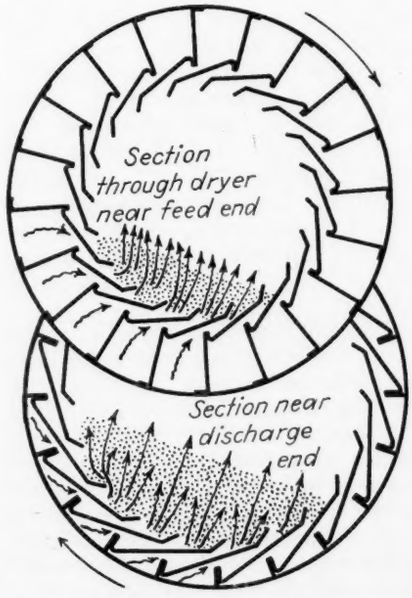


FIG. 4. Diagrams of cross sections near the feed and the discharge ends of the rotary-drum dryer indicate how the heated air is forced through the tumbling mass of ground beef to give a final moisture content of about 10 percent.

requires approximately one-tenth the shipping space that its equivalent does in the carcass state and about one-third that required in the fresh boneless state (Fig. 6). A further saving results because dehydrated beef in airtight containers does not require refrigeration during shipping and storage in spite of its approximate 55 percent protein, 30 percent fat, and 10 percent moisture content. Salt may be added to the product to give an average content of

not more than 3½ percent sodium chloride.

Loss in nutritive value is held to the minimum because there is no waste in the form of juices or broth and because controlled low temperatures are used. The relatively short exposure to atmospheric oxygen and light keeps fat deterioration low. The proteins are considered to be affected no more than they would be in normal household cooking. Mineral salts content is retained in its entirety.

Stabilization of Fat

Stabilization of the fat for long storage periods is a problem that can be solved in at least two ways with a commercial degree of success. One way is by exclusion of light and oxygen and the other is by the addition of an antioxidant. Since beef fat is relatively stable, exclusion of light by packaging in a metal container and exclusion of oxygen by compressing into the container to drive out the air, as well as sealing under vacuum, have thus far been sufficient protection against any chemical change. The dehydrated beef has remained wholesome for the length of the test period of five months.

As a matter of comparison, fat stabilization during the dehydration of pork is complicated by the fact that the quantity of fat in the fresh meat, as well as the physical structure of the meat itself, does not permit reabsorption of the meat juices and added water during precooking, as takes place in the case of beef. For this reason pork dehydration involves several steps not required in the dehydration of beef.

Reduction of trimmable fat to less than 20 percent in the pork to be precooked is not practical. Since naturally occurring higher percentages of fat give considerably more fat in the finished product than can be controlled, reduction in fat content must take place during processing. The excess is removed in the course of precooking. Precooking of pork requires from 1½ to 2 hours instead of the 30 minutes for beef. It produces a mixture of cooked meat, natural liquor and fat.

Because further heat treatment will not result in absorption of the liquor, as in the case of beef, the contents of the cooking kettle are run through a hydraulic press in order to squeeze out the liquor and the fat in combination as a liquid filtrate. This filtrate is run into a settling vat or tank and the fat is skimmed off, as is done in the making of lard from fat trimmings. Removal of the fat leaves a very dilute liquor, which is then evaporated under vacuum until the residue has the approximate consistency of a thick gravy or a heavy vegetable purée.

Reconstituting Product

After the liquor and fat have been removed, the pork press cake is run through the fine grinder, as in the case of beef, and fed directly into the rotary drier to reduce the moisture content to about 5 percent. This dehydrated meat is then mixed with the concentrated liquor and a part of the skimmed-off fat to give a finished product consisting of about 50 percent protein, 40 percent fat, and 10 percent moisture. By this procedure dehydrated pork is produced at the rate of from 500 to 750 lb. per hour in the same dryer that gives 1,000 lb. of dehydrated beef per hour.

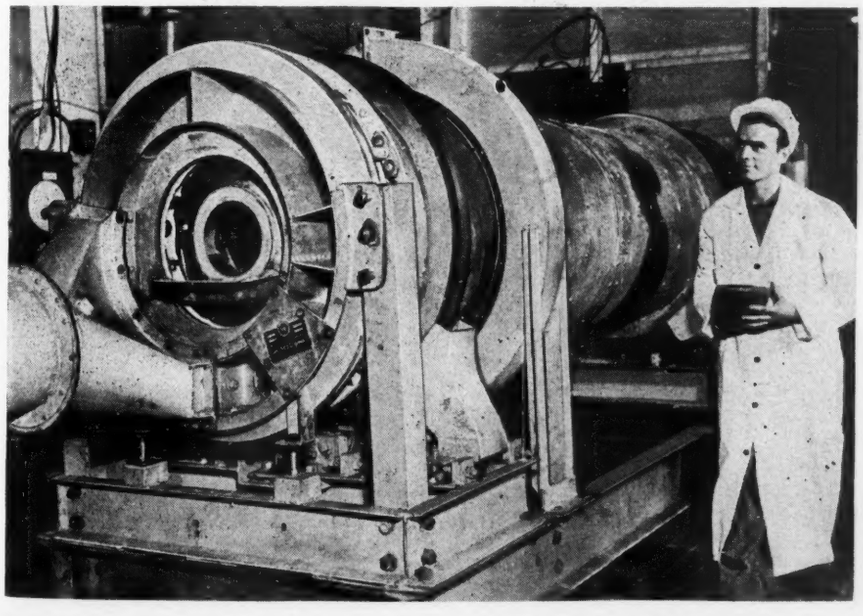


FIG. 5. Already this pilot-plant rotary drum dryer installation is being replaced by four large production units to meet government-contract demand for dehydrated meat.

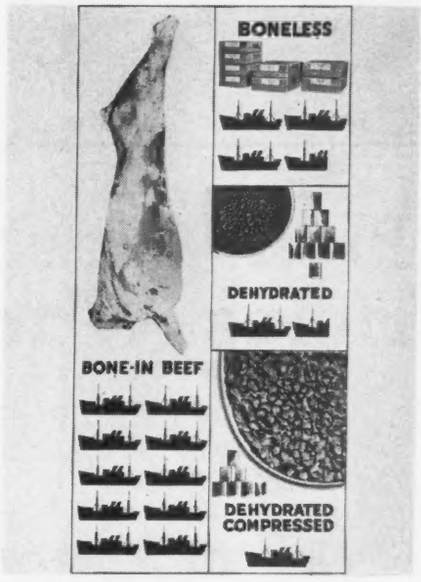


FIG. 6. In its dehydrated and compressed state, one ton of beef requires only one-tenth the shipping space that it does in the fresh carcass form, about one-third that in the boneless form, and about one-sixth that in loosely packed dehydrated form.

Antioxidant for Pork

Because of the 40-percent fat content and because of the instability of pork fat, addition of an antioxidant appears to be advisable. Preliminary tests have shown small quantities of gum guaiac, added during the precooking operation, to be an effective stabilizer. Its effectiveness holds for several weeks even when the dehydrated pork has been exposed in open containers to atmospheric oxygen and to even higher than room temperatures. Extended keeping tests are under way to determine the effectiveness of this antioxidant in dehydrated pork packaged in airtight containers sealed under vacuum.

Since experience with gum guaiac as an antioxidant for lard (U. S. Patent No. 1,903,126) has shown it to have superior properties as a fat stabilizer, there is ample basis for the conviction that it should function in a highly satisfactory manner for dehydrated pork.

Although fat stabilization in dehydrated pork is not as simple as in the case of beef, it is very likely to be of greater importance. Present indications are that dehydrated pork is going to be in greater demand than dehydrated beef. That possibility exists although as yet no government contracts have been placed for the purchase of dehydrated pork.

Some production and packaging difficulties are yet to be worked out.

Plant Mechanization Helps War Effort

By M. E. BRIDSTON
Port Blakely, Wash.

Cooling and conveying equipment installed in Bristol Bay salmon canneries speeds output and improves quality of food needed for military and Lease-Lend purposes—points way to improvement of other canning operations

DEVELOPMENTS at the salmon canneries of Libby, McNeill and Libby in the Bristol Bay region of Alaska constitute one of the greatest advances made in this industry since the introduction of the "Iron Chink," which cuts off heads and tails with one motion, fins with another, then splits the fish and mechanically removes the entrails and waste parts before delivering the fish to the inspection tables. The main purpose of the new improvement was to better the quality of the pack by preserving the lively red color and the flavor that count for so much in the consumer appeal of red salmon. This is done by effecting rapid cooling of the salmon after the cans leave the retorts. Such cooling immediately checks the cooking, thereby preventing color and flavor losses.

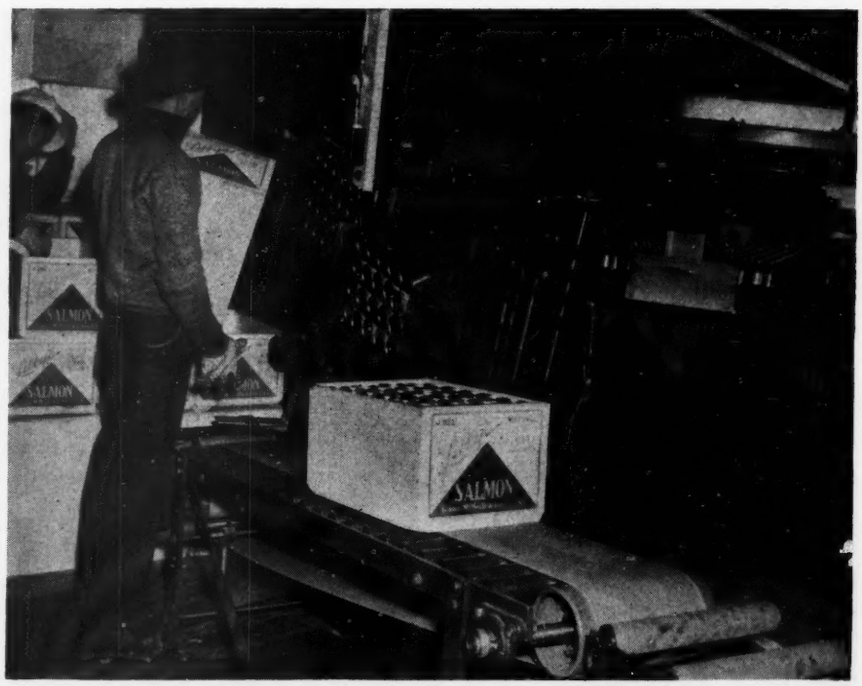
In contrast to the prevailing practice of cooling by stacking the canned salmon for periods up to 24 hours in the trays in which it was retorted, the new system conveys the trays of cans through a 400-ft. spray tunnel. Passage through the tunnel takes but 22 minutes and, when the conveyor pickup is made at the end of the tunnel, the temperature has been reduced from 240 deg. F. to an average of 120 deg. F.

The trays in which the canned salmon is handled are commonly called "coolers" in the industry, because in the past the newly processed pack was cooled on them. These trays were formerly stacked six or seven high, with woodblock separators to allow for air circulation. In the new Libby method of cooling, the pack is still cooled on the trays, but these, at the point of pickup at the retorts become a part of the conveyor system operating through the spray tunnel. Each tray holds 3½ cases of salmon.

The tunnel is constructed of galvanized iron, and is provided with air intakes and outlets. Fans used for air circulation require a total of 22 hp. The overhead trolley conveyor that handles the trays through the tunnel has a 3½ hp. motor and its capacity is 1,000 cases of salmon per hour.

In the tunnel are 550 spray nozzles, delivering a total of 450 gal. of cooling

Trays of cooled salmon cans leave the cooler on the conveyor shown in the background, which delivers them automatically to the inverting machine in the foreground.



At the Ekuk cannery this conveyor system delivers sealed cases directly to a barge standing by at the nearby pier. The barge, in turn, delivers the product to a ship anchored in deep water.

water per minute. This water, supplied from wells sunk about 120 ft. into the frozen ground, has a temperature of around 34 deg. F. Pressure of the spray water is maintained at 45 lb. per sq. in.

At the discharge end of the cooling tunnel, the trays are mechanically released from the conveyor onto one of two inverting machines for unloading. Then the cans move on can conveyors to labeling machines and automatic casing machines. Cases are then conveyed to sealing machines, and thence moved by conveyor to stock piles. From the time that the cans leave the retorts until they are stacked in sealed cases on the floor of the warehouse, approximately 35 minutes has elapsed.

This system of cooling has been installed in two of Libby's Bristol Bay canneries—one at Koggignug, the other at Libbyville. At the same company's cannery at Ekuk, there is another interesting advance in mechanization. A roller conveyor has been installed to handle the cases as they leave the sealing unit directly into a barge, which in turn delivers them to the cannery ship anchored in the deep water of the bay. The usual practice is to load finished packs onto ships at the close of the canning season. At Ekuk, this would take about seven days to load the 90,000-case output.

Technical developments in the wax method of picking poultry have resulted in a light-colored, all-petroleum poultry wax that gives even better results than the first wax mixtures that were used. As the wax coating is removed, the skin of the bird is left free of feathers, splotches, tears and other defects associated with non-wax picking practice.

Improved Processing Helps To Accomplish Wartime Food Job

By HARRY E. DREWS,
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PART I—Heavy demands for poultry to offset meat shortage, record-breaking poultry crop and WPB restrictions on new equipment and plant expansion throw emergency production onto plants which must be operated much more efficiently than under peacetime conditions

NO longer is poultry taken casually as the meat dish for Sunday or special occasions. As a canned food it has been purchased during the past several months by the government for Lease-Lend and for the armed forces. In its fresh dressed, frozen and packaged forms it is becoming a meat of every-day consideration for urban civilians, as it has been for many years with our rural population.

The 1942 poultry crop in the United States is 13 percent larger than any previous poultry crop. This crop is now on the farms. As in every other year part of the poultry crop will disappear through home consumption and through the dressing and sales of small part-time dressers who serve local markets.

Home dressing, particularly of turkeys, has been an important factor during the heavy poultry season. This year there is a shortage of farm labor in most localities. With the increase in size of flocks, more producers are marketing through commercial channels as their surplus over home consumption increases in importance. Already there are indications in the early poultry movement that from 20 to 30 percent more poultry will be processed through the commercial poultry processing plants now existing than has been handled any previous year. The poultry packers are facing a big job.

Because of close limitations on materials, practically no new plants have been established during the present year. Also, a shortage of poultry plant labor is already being felt sharply in many localities. Yet, within reasonable limits, poultry must be dressed and packed when it is prime and ready for market. Male birds become staggy and tough, feed utilization is less efficient, and losses because of overcrowding become serious when desirable market outlets are not available at the right time.

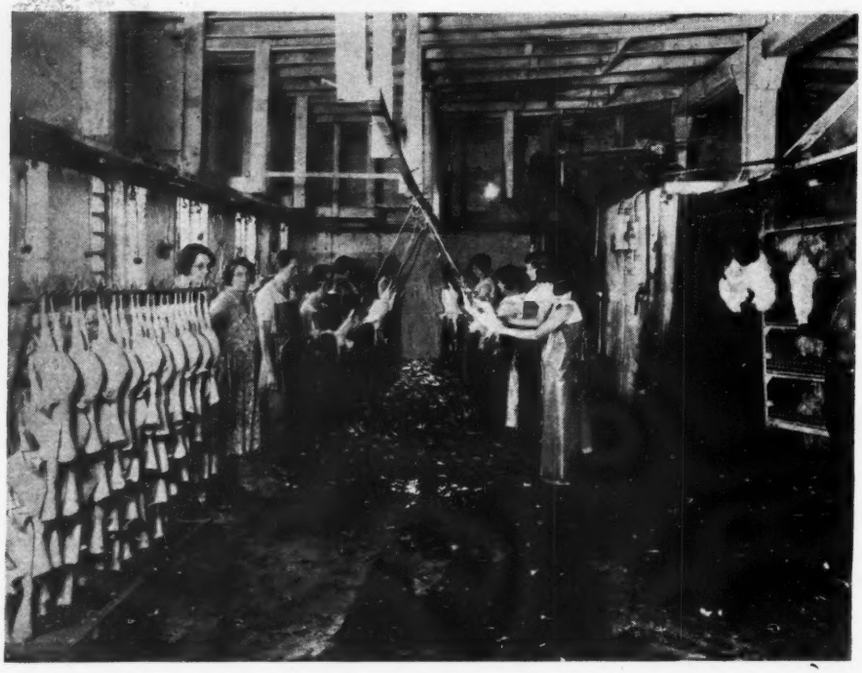
Captain James Gwin of the U. S. A. Quartermaster Corps recently stated that poultry meat is of extreme importance in the food requirements program because of the quickness with which the crop may be extended to take care of heavier demands and because of the replacements of other types of meats that cannot be increased rapidly enough to supply unpredictable demands. Therefore, the proper handling of the present poultry meat crop without waste is a problem of concern to the consumers and also to the food requirements program agencies.

Too Late To Build Plants

It is too late to build new plants, even though the materials might be available. Full utilization of present plant capacities—by operating over extended hours when possible, by stepping up of hourly capacity of present equipment by the addition of supplementary "speed-up" equipment, and through addition of some of the improved labor-saving high-volume equipment that has been devel-

oped during the past two years—offers the only practical solution to this urgent and complex problem.

New equipment is available only in very limited quantities because of the necessity of rigid additional change of critical materials. Since last January poultry processors have been asked to care for their equipment in a way that will cut down on requirements in repairs and replacements as far as possible. Rust, corrosion, excessive abrasion and breakage are common in poultry plants because of the necessity of operating under conditions of high humidity at high capacity. The War Production Board has recognized the problems in the poultry processing field. A careful survey of present processing facilities has been submitted to it by the Institute of American Poultry Industries and other cooperating organizations of poultry packers, and closely limited supplies of materials have been made available to meet the most drastic and urgent of these requirements in equipment. The supplies of materials are small, but somehow they will have to serve.



Poultry dressing plants operating before the days of modern equipment and production methods left much to be desired. Above, a typical poultry picking room before the adoption of the wax picking method of feather removal. Below, the same picking room after the wax picking procedure was adopted. Picking costs were reduced nearly 2 cents per bird. In addition, plant sanitation was greatly improved, as were working conditions.

Better Processing Methods

Accompanying illustrations show some recent developments and improvements in poultry plant equipment that have been developed as an answer to the real need for increasing plant volume, increasing plant efficiency in labor utilization, and in providing an improved product with less waste. Records of operating costs of plants throughout the country have been available for operation studies. High efficiency in the plucking of poultry is evidenced in low cost and in the fine market condition of the dressed birds. A minimum of mechanical injury has been attained through the use of the electric killing machines, automatic scalders, conveyor line systems, roughing of most of the feathers by the automatic picker, and completion of defeathering by the wax or plastic method. "Shock cooling" for quicker and better cooling of the birds after slaughter and the improved eviscerating equipment are saving time and labor in turning out better table poultry.

Electric Stunning

The use of a controlled electric shock for stunning the chickens and turkeys in advance of bleeding is growing rapidly in acceptance. Various devices for this purpose are in use. Some of them are very simple. The use of an electric shock eliminates the struggling of the birds and the flapping of wings which frequently causes breaking and bruising of wings with a consequent reduction in market grade of the birds. The current should be adjustable to prevent overshocking, which causes hard plucking. Improved machines have been constructed with a capacity as high as 2,000 chickens per hour, which is far above the capacity of a hand killer, if he is still available. With properly adjusted oscillation of current, a heart flutter is caused which causes a quick and complete bleeding of the birds before they enter the scalder.

Automatic Scalding

The use of automatic semi-scalding machines which carry the birds suspended by the feet through a tank of agitated water under close automatic temperature control has become general among the commercial poultry plants during the past ten years. These machines provide an immersion period of about 35 seconds in water at a temperature from 128 to 132 deg. F. By the use

of chemical "wetting agents" or penetrants such as Pick-Quick, Tergitol, Aerosol and Nacconol, the quick penetration of the scalding water through the feathers is assured and the period of immersion may be reduced. This shortening of immersion period is accomplished by speeding up the rate of travel of the conveyor line, preferably with a variable-speed unit on the power drive of the conveyor line. The addition of a variable-speed drive to the previous equipment has almost invariably increased sharply the operating capacity of the equipment, usually with a reduction in total picking cost. Within the limits of minimum scalding time for each type of bird, the rate of line travel may be adjusted to keep the pickers supplied with birds to the limit of their working capacity.

Mechanical Wing Pullers

The pulling of the "quills," the heavy feathers of the wings and tail, has always been an unpleasant operation in the dressing of poultry. The work requires a strong man and injury or soreness of the hands is a common occurrence during the heavy operating season. The development of mechanical wing pullers for the removal of these feathers makes possible the use of women employees for this work without undue hardship. The wing pullers are essentially motor-driven serrated steel rollers operating behind a guard. This equipment is particularly popular among turkey dressers because the removal of quills is a more serious problem in the picking of turkeys than of chickens.

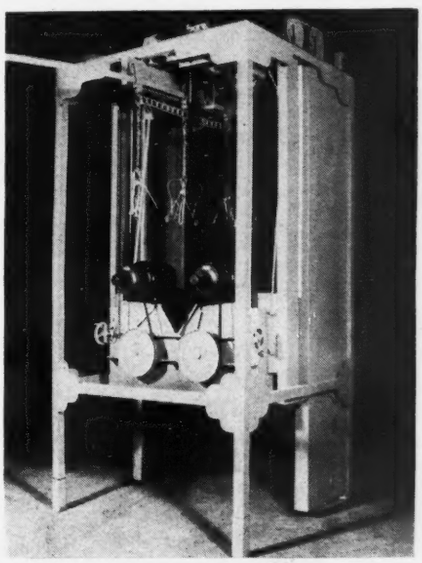
Picking Machines

Two years ago, rapid increase in the use of the new rubber-finger type of picking machines resulted in a sharp cut in picking costs, and an increase in plant efficiency. These machines not only aided in quick feather removal at low cost but they made possible the removal of pin feathers from "pinny" birds more effectively than had previously been possible. The invention and production, within the past year, of the automatic picker, which "roughs" the bird by removing most of the feathers after the semi-scalding process without the use of any manual labor, is now providing another step forward in helping to overcome the problems of labor shortage. In operation, the results attained by the use of the machine are striking, and the removal of small feathers and pin feathers is usually more complete than with the manually operated machines.

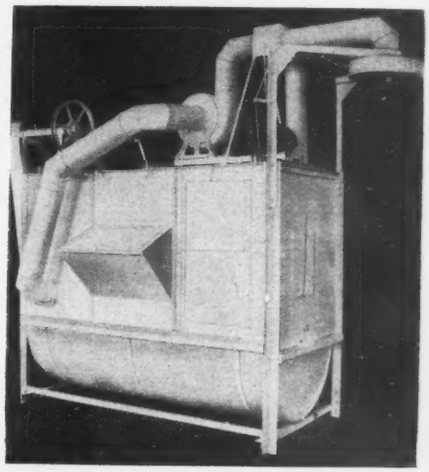
The machine consists of two parallel motor-driven drums with long flexible rubber fingers which overlap slightly at the tips, the point of contact. The chickens are sprayed with warm water during the picking process in the machine. The motor-driven drums are mechanically moved up and down over the suspended birds, each bird being subject to two trips of the machine. The fingers in the second part of the machine, which is in contact with the bird on the second trip, are of special construction to prevent "barking" or bruising of the chicken or turkey. This automatic picker is particularly effective in the removal of feathers in advance of wax defeathering operations, and a reduction in the number of "wax strippers" has been common when the machine has been installed.

Stripping Wax Improved

Late types of all-petroleum poultry waxes have made possible an increase in the capacity of wax-picking installations. The birds do not need to be as dry for the effective operation of this wax as was necessary with previous types of poultry wax. Also, the finish or "bloom" of the birds is improved by the use of this wax, and total wax consumption has been reduced from an average of 2½ lb. to less than 1 lb. per 100 chickens. A filtration method for the cleaning and purifying of the used wax has been developed by the poultry products laboratory of Iowa State College so that used wax need never be discarded because of pollution. Studies of operating costs made at plants during the present poultry season have shown a savings of 1.0 to 1.2 cents per bird in labor cost through the use of wax or plastic picking methods, as compared with plants that do not use these methods for the final defeathering or finishing of the birds.



Automatic picker which removes most of the feathers from poultry. Motor-driven picking drums equipped with flexible fingers travel up and down during the picking operation.



Feather dryer for use in poultry plants. Elimination of imports and heavy use by the armed forces has brought about increased needs for salvaging of feathers from poultry dressing plants.

Heavy use of wax in connection with armament production is resulting in a shortage of some of the basic waxes necessary for the production of efficient poultry waxes, but the needs of the poultry industry are being recognized by the War Production Board. The importance of furnishing poultry wax requirements has been accepted, and it is probable that adequate wax supplies will be provided if the poultry processors will economize in every way possible in their wax consumption.

Changes in Quality

Changes in the poultry carcass begin immediately after death. All of the changes which occur are not harmful to the eating quality of the poultry meat. Action of the body enzymes and lactic acid in the tissues brings about a tenderizing action. The maximum of tenderizing action has occurred within 48 hours in most poultry. Further aging does not materially improve the tenderness factor. Tenderness and flavor studies conducted in the home economics laboratories of Iowa State College indicate that deterioration of the edible portion of poultry that is not eviscerated begins as early as eight hours after the poultry is killed, and the first evidence of change is shown in the spread of the bile through a larger portion of the liver. Later the "bile flavor" spreads throughout the carcass, first to the portion of the loin and back near the liver and later to all portions of the carcass, including the very wing-tips.

Part II of this article will be published in the November issue of FOOD INDUSTRIES.— THE EDITORS.

PICTURES OF P

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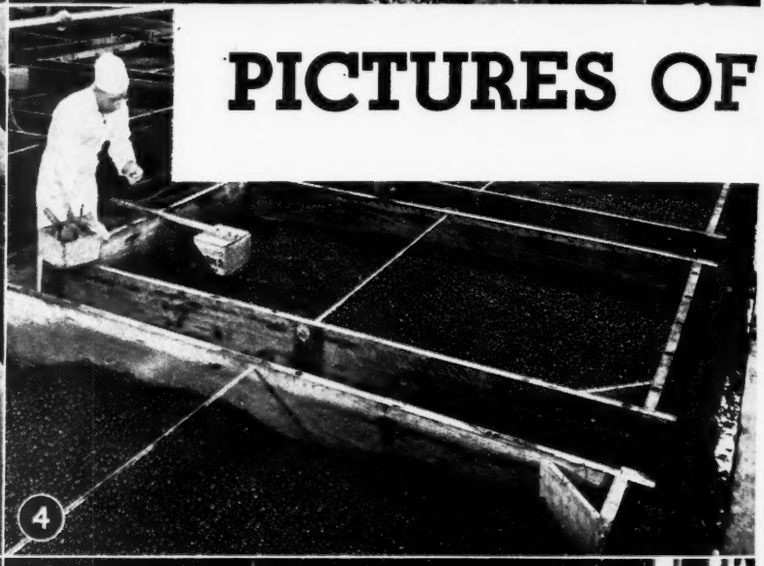
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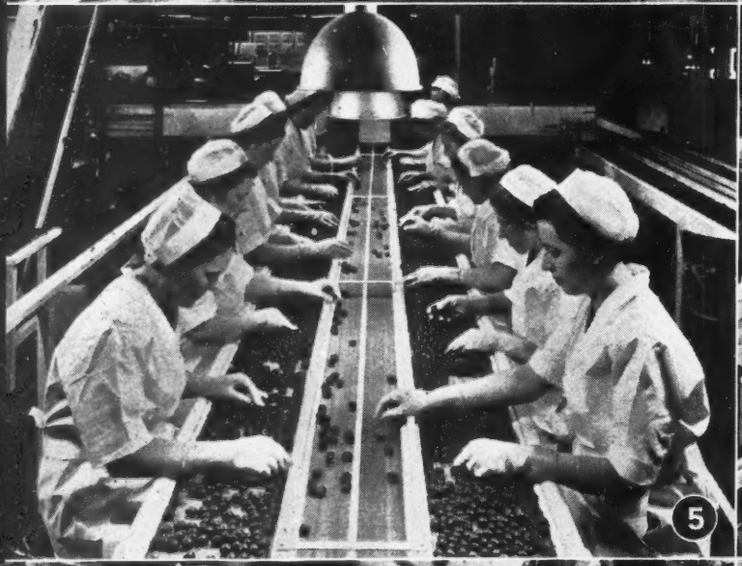
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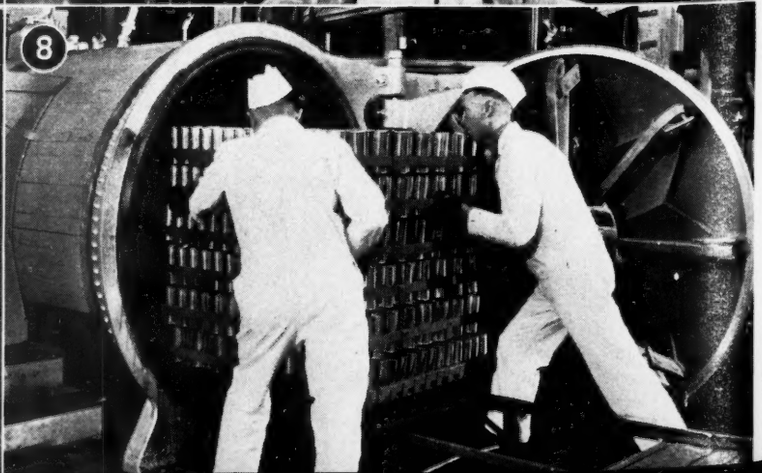
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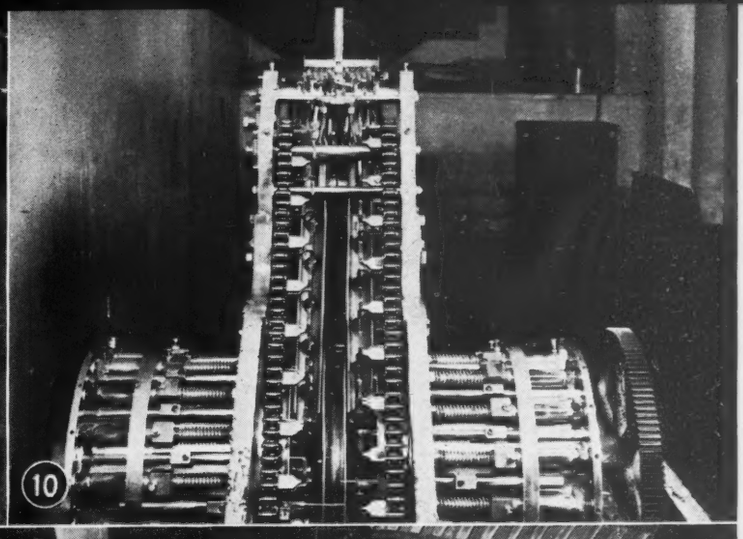
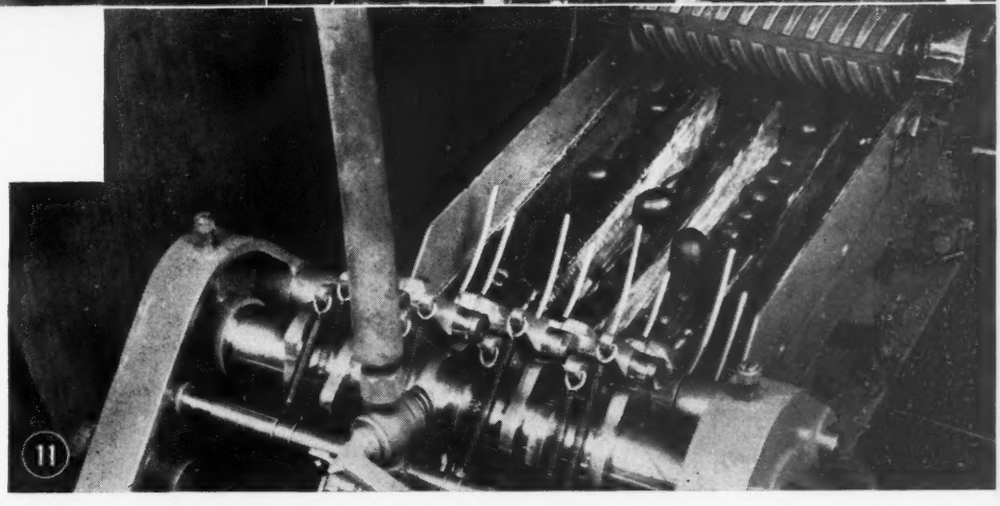


PROCESSES

Between the tree and the container, olives go through many unit processes and operations. And special equipment is used to some extent. These pictures show olive processing in the plant of Lindsay Ripe Olive Co., Lindsay, Calif.



Photos courtesy of LINDSAY RIPE OLIVE CO.

1. October is olive-picking time. Olives for ripe or green processing must be carefully picked in small containers. Olive trees grow 50 ft. high, but commercial orchards are kept pruned back as it is difficult to pick the fruit from trees more than 25 ft. high.

2. Grading fresh olives. As soon as the fruit reaches the plant it is sorted to remove leaves, culls, and so forth. Then it is graded for size in the machine in the foreground, which consists of cables that diverge as they travel toward the far end of the machine.

3. Close-up of feed end of sorting belts of grader shown in picture 2.

4. In the ripe-olive process, treatments with mild caustic solutions and exposure to air remove the bitterness of the fresh olive and develop the dark color. This follows storage in 6 to 8 percent brine for six weeks to harden the fruit and ferment out the sugars and precedes holding for 2 days in 25 percent salt brine for curing.

5. Resorting processed ripe olives. Following processing, the fruit is again run over a sorting belt to remove damaged olives and those with poor color.

6. Final inspection before canning. Girls examine ripe olives and fill them into enamel-lined cans.

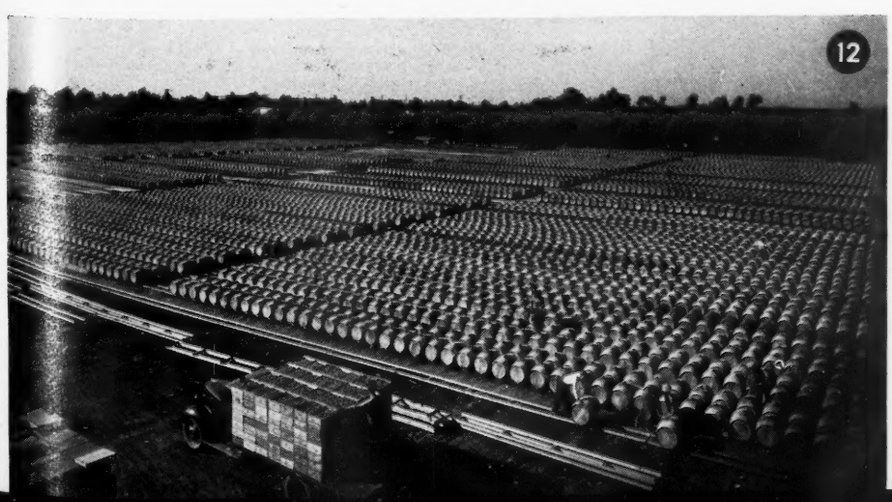
7. Brining and sealing the cans. Hot water (above 190 deg. F.) is put into the cans after they are filled with olives. Just ahead of the sealing machine a dispenser adds enough salt to give a 2½ percent brine. The closing machine embosses a code on the lid of the can to identify it in the warehouse.

8. Sterilizing the olives. After sealing, the cans are stacked on iron trays, pushed into a retort and sterilized for one hour at 240 deg. F.

9. Labeling the cans and packing them in paperboard containers for shipment to distribution outlets.

10, 11. The machine that pits olives. From a vibrating hopper, the olives are fed one at a time into aligning chutes by an indexing device (11). At the bottom of the chutes the olives are carried around a pitting drum. A coring knife cuts a circle at one end and a pin advances from the opposite side to punch the pit into the coring knife.

12. In processing Spanish style green olives, the fruit is given a caustic treatment and then put into 50-gal. oak barrels in brine and stored in the sun to ferment. The process takes about eight months, during which time the sugar of the olive is fermented to lactic acid.



Cooling Storage Rooms By Brine Spray System

By G. O. WEDDELL
York Ice Machinery Co., York, Pa.

PART II* — Method introduced for food storage where rapid precooling, followed by holding at steady temperature, is desired — pioneered by citrus fruit growers — has improved results in apple storages. This article forecasts combination with quick freezing of fruits and vegetables

ANOTHER unusual installation, and the second brine spray apple storage job in the eastern section of the country, is the plant of Treesdale Farms, Inc., Mars, Pa., fifteen miles north of Pittsburgh. Briefly, there are two rooms called caves, each 113 ft. long by 28 ft. wide by 11 ft. high, surrounded by earth on three walls and about 24 in. of earth on the ceiling. The walls are constructed of 12-in. tile and the ceiling consists of a 6-in. concrete slab supported by the two outside tile walls, a center brick wall, and two rows of brick columns in each room on about 8-ft. centers. When refrigeration was installed in 1940, no insulation was applied to walls and ceiling, but the floor was excavated to accommodate about 15 in. of cinders. A space of about 6 in. was left between the top of the cinders and the 2-in. slotted plank floor.

Since the insulation of these rooms with 3-in. corkboard would have cost about $8,000, Francis G. Reiter, the manager, decided that this expense was prohibitive and that he would refrigerate the existing rooms using cinders only for floor insulation.

The refrigerating equipment consists of one ammonia compressor driven by a 20-hp. motor, one compressor driven by a 5-hp. motor, a shell-and-tube condenser, a receiver, and one spray-type air conditioner in each room with a discharge duct extending in the center of the room on the ceiling for about 100 ft.

These two rooms, on account of the large number of columns, hold only 20,000 bu. of apples, but some apples were stored for only a short period of time, so that there was a total of 25,000 bu. that passed through the storage each season. At certain times, both compressors were used during the loading season; but from November 1, 1940, to May 1, 1941, the 5-hp. compressor only was used. Of course, during the holding period, the two-speed fan motors were operated at reduced speed. For this period of time the rooms were held at an average temperature of 33 deg. F. In this connection, a test was run from October 15 to December 15 in which temperatures were taken inside and outside every morning and evening. During this test, the outside temperature naturally varied considerably but the temperature inside the rooms at no time varied more than 1 deg. F.

The power cost for the above season was $1,266, at an average rate of slightly more than 2 cents per kw.-hr.

The cost per bushel per season was

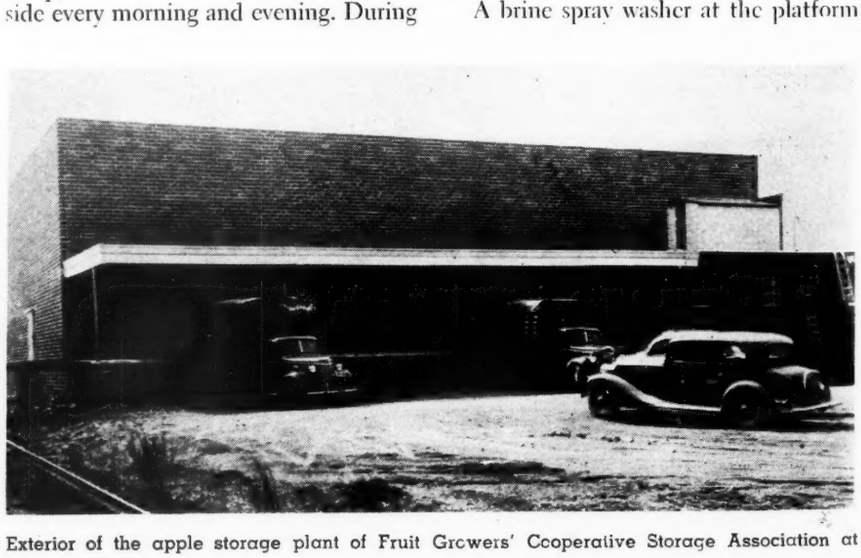
$$\frac{\$1,266}{25,000} = 5 \text{ cents.}$$

With this improved type of storage, Treesdale Farms effected a saving last season of $3,900 in storage charges.

Another Apple Storage

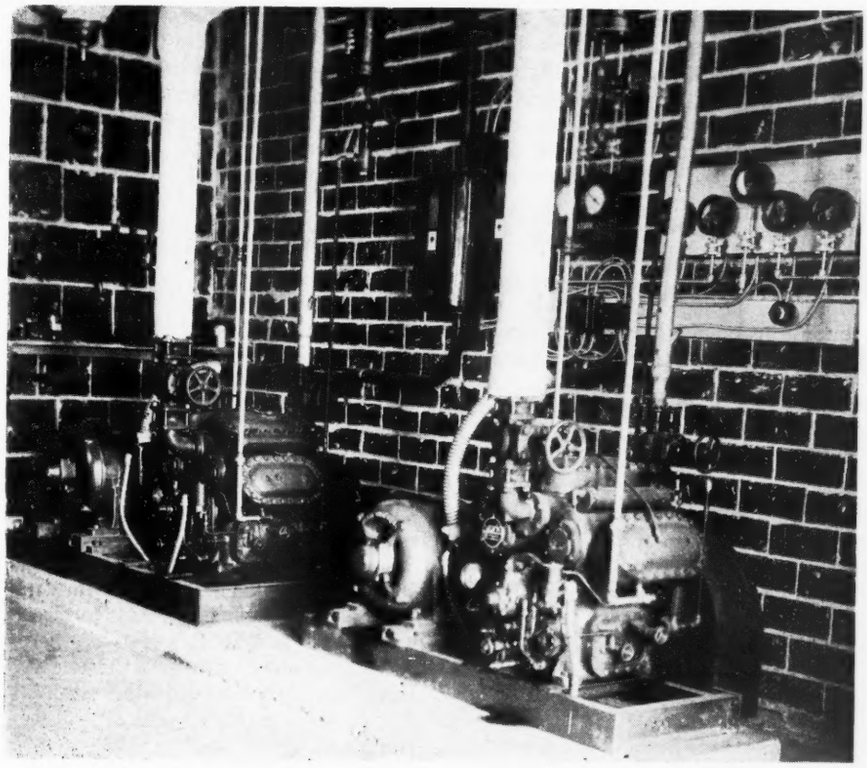
The recent construction of a 160,000-bu. storage made by the Fruit Growers Cooperative Storage Association, Romney, W. Va., is quite interesting. This plant is the same size in floor area as the Consolidated Orchard Co.'s plant at Paw Paw, but it is three stories high, that is, three floors each 120 ft. by 100 ft. by 12 ft. high. There is also a storage room under the loading platform about 70 ft. long by 20 ft. wide by 12 ft. high. The construction is the same as the job at Paw Paw, except that the ceiling of the third floor is of wooden construction with one layer of 2-in. sheathing, a 4-in. air space, $\frac{7}{8}$-in. sheathing, 4 in. of rock wool insulation, $\frac{7}{8}$-in. tongue-and-groove sheathing and 4-ply felt and gravel roof. The floor of the first-floor storage is concrete underlaid with about 24 in. of crushed rock instead of cinders, which could not be obtained at that time.

A brine spray washer at the platform



Exterior of the apple storage plant of Fruit Growers' Cooperative Storage Association at Romney, W. Va.

* Part I of this article appeared in *Food Industries*, September, 1942.



Refrigeration is supplied at the Romney plant by York 3¾ x 3 V/W type ammonia compressors, driven by 40-hp. and 25-hp. motors.

end of the second floor is of the blow-through type equipped with direct-expansion galvanized cooling coils with float control, a brine spray pump and a main supply fan handling about 50,000 cu. ft. per minute. Wooden ducts connect from the discharge of the washer to the three floors, with two supply ducts on each floor. The washer room acts as a plenum chamber into which the air from the three floors is drawn, and also air from the room under the platform. An opening in the outside wall of the washer room with regulating damper permits drawing in the necessary outside air for ventilation.

The refrigerating equipment consists of one latest V/W-type ammonia compressor driven by a 40-hp. motor and another compressor of the same type driven by a 25-hp. motor. Two closed-type condensers, a receiver and a 200-gal. spray tower with a water circulating pump completes the condensing equipment.

Automatic controls are provided for operating either one or both compressors as the load requires. E. A. Leatherman, Rada, W. Va., president of Fruit Growers Cooperative Storage Association, deserves the credit for this layout.

Attention is called to the fact that this design lends itself admirably to the rapid precooling of the fruit. During the loading period, the ground floor is loaded first, and with air to the second and third floors shut off by means of dampers, the entire air volume can be directed to this floor. The second floor can then be filled with the entire air volume on these two floors and finally the third floor filled. Of course, by that time over 100,000 bu. has been precooled and, with lower outside temperatures, the refrigerating equipment will supply colder air for the precooling of the third floor.

The room under the platform was intended for a peach storage and a damper at the supply fan was provided to cut down the air volume for refrigerating this room only. This space would be suitable for a rapid precooling room or for an apple freezing room in case the freezing of sliced apples might be considered in the future.

No power cost data is yet available for this plant.

The Humidity Factor

In reference to the question of relative humidity, this is quite secondary to quick temperature reduction during the precooling period and, therefore, no attention is paid to it during the loading up of the storage. The important job then is to precool the apples with all the refrigeration available, with maximum air circulation at whatever operating conditions the equipment balances.

During the holding period, lasting from six to eight months, the relative humidity can usually be held at 80 to 85 percent. This depends on the split between the temperature of air entering and leaving the storage. This in turn depends on the volume of air circulated, the amount of evaporating surface in the air conditioners, and the temperature of brine to the sprays. With properly balanced design and selection of equipment, this temperature split is usually from 1 to 2 deg. during the holding period, and if necessary, an ammonia suction pressure regulator can be used to hold the brine temperature as high as possible and still maintain the desired storage temperature.

The proof of the pudding is in the eating. Therefore, since growers of wide experience in the operation of brine spray systems have always secured very satisfactory results in the cold storage of apples, pears, and so forth, it obviously follows that the relative humidity carried has been universally proper and satisfactory.

In storages with uninsulated walls, the relative humidity may be affected by the difference in vapor pressure between the outside and inside when below-freezing temperatures prevail outside. The drier outside air may draw moisture from the cold storage through the joints in the walls, around the door gaskets, and so forth. At the present time we have no data as to what extent this might be true. At any rate, it is results that count, and so far the fruit taken out at the end of the maximum storage season has invariably been of excellent quality.

Advantage of Brine Spray System

It is not the intent of this discussion to infer that apple storages cannot be refrigerated to the satisfaction of the grower by the use of direct-expansion ammonia piping, brine piping or dry-coil air conditioning units. Too many installations using these methods are in operation today for anyone to boldly assert that there is only one way to do it. Nevertheless, it can be stated definitely that a very large number of successful apple growers have found from experience that the brine spray system does a better job than any other, and in addition has many advantages, of which the following are the most evident:

a. More rapid precooling of the fruit during the loading period.

b. Even temperatures throughout the storage all the time.

c. Uniform and proper relative humidity during the entire storage season.

d. No defrosting problems. Brine spray keeps coils free of frost. This

provides maximum heat transfer and thus maximum operating efficiency of the equipment all the time. This is particularly important during the loading period.

e. Maximum capacity of the refrigerating equipment is available constantly so that a definite fruit-receiving capacity is daily assured. In contrast to this, frosting of the pipe coils gradually cuts down the refrigerating capacity of the plant.

f. More storage capacity in a given space. In some cases this would be a very considerable amount. This in turn means lower cost of construction and refrigeration per bushel stored.

g. No freezing of the fruit, even at −15 deg. F.

h. Necessary outside air can be brought in for ventilation during the holding period.

i. Lower initial investment for the refrigerating equipment.

In connection with the cold storage of apples, there is another recent development that is worthy of mention and one that may have good business possibilities. I refer to the freezing of sliced apples. Several plants in the Shenandoah Valley of Virginia are already processing and freezing sliced apples for pie making. With the refrigerating equipment only partially loaded during the winter months, the apple freezing proposition fits into the picture in an economical manner by providing a higher load factor and thus reducing the fixed charges.

As soon as an apple storage is equipped with facilities for freezing fruit, a larger field immediately develops, for then it is equipped for the freezing and storage of peaches, berries, cherries, vegetables, and so on. Thus, it would seem that the future holds many promising possibilities for the apple grower who has his own efficient cold storage plant.

How To Make Better Marshmallow Cream

By TULIO CORDERO and CHARLES SHACKELFORD

Department of Research and Technology, United Drug Co., Boston, Mass.

Simple tests and controls make possible the manufacture of marshmallow cream with good volume and keeping properties. Shrinkage and separation in storage prevented by right mixing temperature and formula balanced to give proper pH

IN an effort to produce marshmallow cream which could be economically and successfully manufactured and which would withstand storage and transportation for long periods of time under varying conditions of temperature, a study was made of some physicochemical factors affecting the product.

It is generally acknowledged in the trade that a good marshmallow cream should be brilliantly white, capable of being whipped to twice its volume on addition of water in the right proportions, of good vanilla flavor and stable for at least nine months after manufacture.

A marshmallow cream may deteriorate in any one or all of three ways. It may lose air and therefore shrink. It may separate sugar sirup. It may decompose due to fermentation.

The danger of fermentation is greatly diminished by the use of the highest quality of raw materials, by cleanliness in manufacture and by the use of the proper preservative. Therefore, the problem of quality control resolves itself into a study of the causes of shrinkage and sirup separation. Since the two often go hand in hand, we found that the elimination of one would almost always remove the other.

The published literature on marshmallow is meager on essential information, consisting almost wholly of formulas and very sketchy notes on manufacturing. Most of the published articles refer to cast marshmallows or marshmallows for bakery use.

Basic Formula for Marshmallow Cream

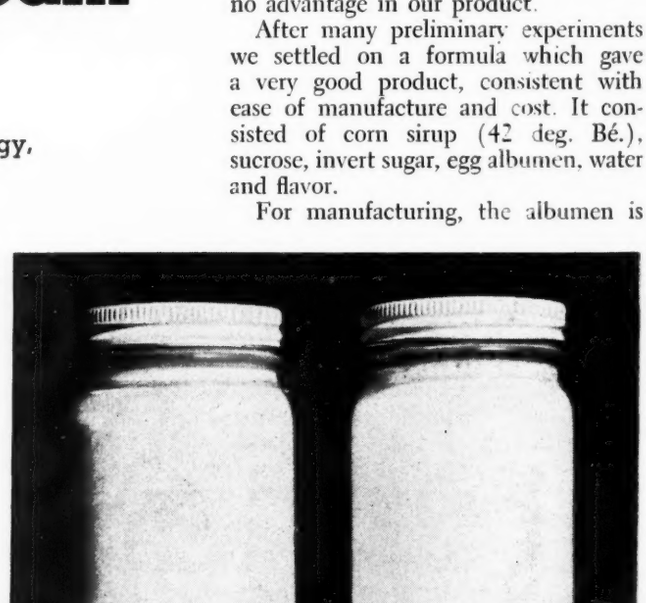
Essentially, marshmallow cream consists of:

1. A sugar sirup portion which may be all corn sirup, or corn sirup plus invert sirup, refiners' sirup, cane sugar or dextrose, or any combination of these. Corn sirup alone gives a rather heavy, stringy consistency, while the addition of sugar gives more "shortness" and less stringiness.

2. Egg albumen or a combination of gelatine and albumen. In our own work we used only egg albumen. Gelatine is more useful in the production of cast marshmallows, but we found it was of no advantage in our product.

After many preliminary experiments we settled on a formula which gave a very good product, consistent with ease of manufacture and cost. It consisted of corn sirup (42 deg. Bé.), sucrose, invert sugar, egg albumen, water and flavor.

For manufacturing, the albumen is



Samples of marshmallow cream submitted to stability tests. The sample on the left withstood test over 30 days. The sample on the right broke down after 6 days.

TABLE I—Effect of Mixing Temperature on Stability and Consistency of Marshallow Cream.

Sample No.	Mixing temperature (deg. F.)	Specific gravity	Consistency at 68 deg. F. (seconds)	Stability under test conditions (days)
41	180	0.55	39.7	58
42	160	0.53	8.1	27
43	140	0.56	7.3	21
44	120	0.59	2.4	6

TABLE III—Effect of pH on Stability of Marshmallow Cream.

Sample No.	pH	Consistency at 68 deg. F. (seconds)	Stability under test conditions (days)
54	4.0	8.5	27.0
43	5.0	7.3	21.0
55	6.0	6.1	13.0

soaked in water the previous night and strained before using. The sugars are cooked to 224 deg. F., transferred to a mixer and cooled. The albumen solution is then added and the mixture whipped for a predetermined time. For mixing the laboratory batches we used a Hobart Mixer of 2-gal. capacity.

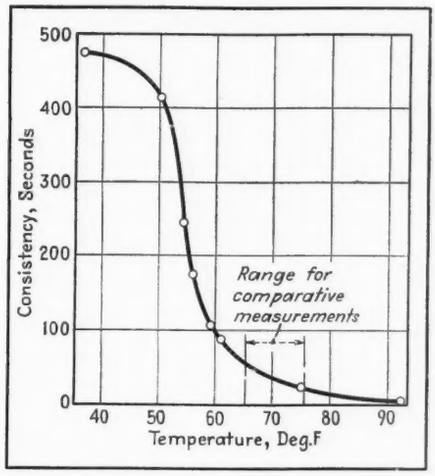
Stability Tests

Various methods were tried in an effort to cause a breakdown of the marshmallow prepared. Finally, we found that exposing the samples for 24-hour periods alternately at 34 deg. F. and 125 deg. F. brought about sirup separation of some of the samples. If a sample stood this severe test for 20 days, we classified it as very good. We found that a commercial marshmallow of the highest quality was capable of withstanding this treatment for over 30 days. Marshmallow creams of poor quality, some of which had separated and shrunk while on the store shelves, would break down in our test after 48 hours, that is, 24 hours at 34 deg. F. and 24 hours at 125 deg. F. All samples were exposed first to cold and then to heat.

Physical Measurements

Two significant properties of marshmallow cream are specific gravity and consistency. Specific gravity was determined by weighing samples in a small cup which had previously been calibrated with water at 77 deg. F. Consistency was measured by the time it took a plunger of predetermined size and weight to travel a fixed distance into the marshmallow cream.

As will be shown later, we found that the consistency is directly proportional to the stability, that is, the firmer a sample the better it would stand the breakdown tests. While specific gravity is not as important as consistency in relation to stability, it is nevertheless important as regards appearance and yield per batch. A sample with too low specific gravity will be too spongy. A marshmallow cream with too high specific gravity gives a low yield per batch and has an undesirably solid, compact appearance.



Curve showing the effect of temperature on the consistency of marshmallow cream (sample 41, Table I). Temperature range from 65 to 75 deg. F. gives best comparative measurements.

Effect of Mixing Temperature

Our first experiments were concerned with the effect of different temperatures during mixing. By using a jacketed Hobart bowl and circulating mixtures of steam and water we were able to obtain a wide range of temperatures. The standard procedure was to cook the sugars to 224 deg. F., cool them to a definite temperature, and circulate hot water through the jacket so that the water leaving the jacket was always at the initial mixing temperature. The basic formula given above was always used and the mixing and whipping procedures were similar in each case.

Table I shows the relationship between consistency and stability. By studying the last two columns of the table, the reader will note the striking relation between consistency and stability. As we stated before, the firmer a sample the more stable it will be. Therefore, consistency measurements may be used as an index to the stability of marshmallow cream.

All consistency tests must be done within a narrow temperature range, since marshmallow cream is very sensitive to temperature changes, as the accompanying chart shows. Consistency tests should be carried out at some specific temperature between 65 and 75 deg. F. Below 65 deg. the consistency is greatly affected by small temperature changes. Above 75 deg. consistency readings are too low to be useful as comparative figures.

Relation of pH to Stability

The stability of this type of froth or emulsion is dependent upon the partial "denaturation" or coagulation of the albumen which is adsorbed at the interface between the dispersed air and continuous liquid phase. This denaturation or coagulation most easily occurs at the iso-electric point of the albumen, the point of minimum dissociation, where there are equal numbers of dissociated hydrogen and hydroxyl ions.[3] This means that for maximum stability the pH of a stabilized colloidal system of this kind should be close to the iso-electric point of albumen.

Since albumen is a hydrophyllic colloid, that is, one with affinity for water, and since it possesses amphoteric properties, it is highly sensitive to variations in pH. Its iso-electric point is between pH 4 and 5, and the pH of a marshmallow cream stabilized by albumen should be close to this value, so that the heat of processing will insure ample coagulation of the albumen and the production of a tough, flexible, stable film.[1,2,4,5]

We made three samples, adjusting the pH by using citric acid or sodium hydroxide as required. The mixing temperature was 140 deg. F. and whipping time and speed were the same in each case.

Conclusions

1. Temperature control is essential in the manufacture of high-quality marshmallow cream.

2. The higher the temperature maintained during mixing, the firmer and more stable the product will be, but it should not exceed 180 deg. F. in order to avoid excessive albumen coagulation.

3. The pH of the product should be between 4 and 5 in order to insure maximum stability.

4. Consistency measurements may be used, comparatively, for predicting the keeping qualities of marshmallow cream.

5. Marshmallow cream should never be stored at temperatures above 75 deg. F. As shown by the consistency-temperature curve, marshmallow becomes much less firm at temperatures over 75 deg. F. This drop in consistency would accelerate any tendency of the product to separate.

References

1. Robert H. Bogue, "The Theory and Application of Colloidal Behavior," McGraw-Hill, Vol. 1, 1924, pp. 214, 223-4, 230, 231.
2. William Clayton, "Theory of Emulsions," Blakiston's, 3rd Edition, 1935, pp. 31 to 51.
3. Ross A. Gortner, "Outlines of Biochemistry," Wiley, 2nd revised Edition, 1938, pp. 359-61.
4. Peter & Bell, *Industrial and Engineering Chemistry*, Vol. 25, pp. 1054, 1933.
5. *Ibid*, Vol. 22, pp. 1124, 1930.

Brief Summaries Of Grade Standards

For the convenience of those who control quality in the food industries, the following digests have been prepared of the standards issued by the Agricultural Marketing Administration.

ABSTRACTS containing the principal requirements of the standards issued by the Agricultural Marketing Administration of the Department of Agriculture are prepared by FOOD INDUSTRIES. Those that follow and those which appeared in the August, September, October and November, 1941, and July, August and September, 1942, issues are a continuation of the series begun in 1940.

The complete text of the standards can be obtained from the AMA, located in Washington, D. C.

Canned Yellow Clingstone Peaches

Types of canned peaches are as follows: Clingstone peaches are peaches having stones or pits which adhere to the flesh. Freestone peaches are peaches, the flesh of which separates readily from the stone or pits.

Styles of CANNED YELLOW CLINGSTONE PEACHES include: Halved canned peaches which are peeled and pitted peaches, cut approximately in half along the suture from stem to apex. Quartered canned peaches which are halved peaches cut into two approximately equal parts. Diced canned peaches which are peeled and pitted peaches cut into cubes. Sliced canned peaches which are peeled and pitted peaches prepared by slicing the halved peaches longitudinally. Whole canned peaches which are whole peeled peaches and are unpitted.

U. S. GRADE A or U. S. FANCY canned peaches are units of peaches of similar varietal characteristics which possess a normal flavor and which are of such quality with respect to color, uniformity of size and symmetry, absence of defects, and character of fruit as to score not less than 90 points when scored in accordance with the scoring system outlined herein.

U. S. GRADE B or U. S. CHOICE canned peaches are units of peaches of similar varietal characteristics which possess a reasonably good and reasonably uniform color, are reasonably free from defects, possess a reasonably tender texture, possess a normal flavor, and are of such quality with respect to uniformity of size and symmetry as to score not less than 75 points.

U. S. GRADE C or U. S. STANDARD canned peaches are units of peaches of similar varietal characteristics, which possess a fairly good and fairly uniform color, are fairly uniform in size and symmetry, are fairly free from defects, possess a fairly tender texture, possess a normal flavor, and score not less than 60 points.

U. S. GRADE D canned peaches may be noticeably variable in color but not definitely off-color; may be noticeably variable in size and symmetry; are fairly free from pathological defects; may possess mechanical defects and may contain not more than 1 sq. in. of peel (in peeled peaches) per lb. of net contents, nor more than 1 pit or 1 piece of pit per 100 oz. of net contents; may possess a noticeably variable texture with not more than 25 percent by weight of mushy fruit; and possess a normal flavor. Peaches of this grade that are packed in "water, slightly sweetened" will be certified with the additional statement "Seconds." Peaches of this grade that are packed in water will be certified with the additional statement "Water Grade."

Canned peaches that fall below the standard of quality promulgated under the Federal Food, Drug, and Cosmetic Act shall be certified with the additional statement "Below Standard in Quality," together with the reason for so certifying.

U. S. GRADE C (Solid Pack) canned peaches are peaches packed without added water or sirup that meet the requirements for U. S. GRADE C.

U. S. GRADE D (Solid-Pack) canned peaches are peaches packed without added water or sirup that meet the requirements for U. S. GRADE D.

OFF-GRADE canned peaches are peaches that fail to meet the requirements of the foregoing grades.

U. S. GRADES A, B, and C of canned clingstone peaches are usually packed in sirup. Sirup "cut-out" requirements, however, are not incorporated in the grades of the finished product since sirup, as such, is not a factor of grade for the purpose of these grades. Canned peaches will be certified as to grade without regard to sirup density, but in each instance Federal inspection certificates will indicate the density of sirup found upon examination. When samples are officially drawn, the designation of sirup will be based upon the average sirup density of all containers examined, provided the range of variability is within the limits of good packing practice.

"Extra heavy sirup" means that the sirup tests are 24 deg. or more, but not more than 35 deg. Brix. "Heavy sirup" means that the sirup tests 19 deg. to 24 deg. Brix. "Light sirup" means that the sirup tests 14 deg. to 19 deg. Brix. "Water, slightly sweetened" means that the sirup tests less than 14 deg. Brix. "Water pack" means that the product is packed in water.

The container shall be filled with clingstone peaches as full as practicable without impairment of quality. The product and packing medium shall occupy not less than 90 percent of the total volume capacity of the container.

Drained weights of canned clingstone peaches are determined by emptying the contents of the can upon a circular sieve of proper diameter containing 8 meshes to the in. (0.097-in. perforations) and allowing to drain for 2 minutes. A sieve 8 in. in diameter is used for No. 2½ cans and smaller, and a sieve 12 in. in diameter is used for No. 10 cans.

Under the factor of color, the uniformity and the intensity of the typical color are considered. The factor of color shall not be scored when grading spiced peaches, but the color shall be normal for this type of product.

To receive a rating of 18 to 20 points, the peaches must possess a good, practically uniform color. "Good, practically uniform color" means that the peaches possess the bright, typical yellow to orange-yellow color of well ripened fruit which approximates, or is better than, Plate 9, L-7, as illustrated in Maerz and Paul's "Dictionary of Color."

If the color of the peaches is reasonably good and reasonably uniform, a score of 15 to 17 points may be given. "Reasonably good and reasonably uniform color" means that the peaches may vary slightly in color which is typical and which approximates, or is better than, Plate 9, L-4.

(Turn to page 106)

How To Maintain Electric Controllers

By E. H. ALEXANDER,
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Many operations in food plants are dependent upon efficient performance of such electric devices as contactors, relays and float switches. Where to look for trouble in these devices and how to correct it are told in this article. The advice is easy to follow

A FIRST consideration in keeping control equipment in proper working condition is to prevent an accumulation of dirt, oil, grease or water on the operating parts of the control. It is, therefore, advisable to carry in stock protective paints for the stationary iron parts, and insulating varnish of the proper characteristics for the coils.

Where the air is saturated with moisture, or subject to the action of corrosive gases, it is well to inspect and paint the various control parts from two to four times a year, depending on the severity of the operation conditions.

It is often desirable to add heaters or lamps within the controller enclosure to prevent condensation of excessive moisture. For best results, such heaters should be energized continuously, especially when the controller is not being used.

Circuit breakers or contactors are usually of very rugged construction. Still, it is best to operate them by hand from time to time and check to make sure that all of the clearances are normal and that parts are working freely. Adjustment and cleaning, as well as renewal of the tips, is necessary.

Occasional inspection should be made of all nuts and connection wires on panels and resistors, particularly when subject to vibration. Close inspection of pigtail connections should be made periodically.

Float switches should be given the best of care, especially if they are of the moving-contact type. The tips should be adjusted and lined up properly and, of course, cleaned if any indication of excessive corrosion is noted. The bearings should be made free to operate and any tendency towards binding should be corrected immediately.

In float switches of the mercury-contact type, the mercury tubes should be held tightly in place, and if inspection shows that the tubes are becoming dark, it may be an indication of air leakage and the tubes should be renewed.

Trouble Shooting

Troubles are bound to occur in the best of control equipment. Knowing what to do about them when they do occur will save much precious production time.

Contactors. A contactor has several bolted or spring-closed contacts. Excessively high resistance at these contacts is the cause of the very high temperatures, such as 100 to 200 C., that may be reached when the contactor is carrying rated current or less. The most likely point of high resistance is at the contact where the movable tip makes contact with the stationary tip.

However, high resistance may occur at any of the several bolted joints on the contactor. Therefore, if one of these devices begins to develop an excessive temperature, a millivolt-meter should be used to determine which of the several joints has a high voltage drop across it.

When a copper contact that has excessive drop across it has been located, correction can be made by opening the contact and removing the oxide with a file (not with sandpaper or carborundum paper).

Sometimes it is not practicable to file contacts. In this event, a silver face can be brazed to the two tips.

Electrical interlocks may fail to make circuit because of oxidation where copper contacts are used. Sometimes such failure occurs because dirt gets between the contacts. By using one hemispherical and one flat tip made of silver, both of these troubles will be overcome.

Excessive wear on the contact tips of a contactor indicates that it is operated frequently, and silver should not be used for such contacts because it does not stand up under severe service as well as copper.

Some maintenance men have the erroneous impression that contact tips that have been roughened by service should be kept smooth so that they will carry the load. A roughened tip will carry current just as well as a smooth tip. Of course, if a large projection should appear on a tip because of unusual arcing, it should be removed. But a tip that has been roughened by ordinary

Replacing a movable contact on a 2,300-volt motor control. Renewal parts should be kept handy so that replacements can be made quickly, and such control devices should be systematically inspected, cleaned and adjusted.

arcing need not be serviced. If a copper tip becomes overheated, this condition indicates that oxide has developed and should be removed.

A large percentage of contactor-coil troubles can be traced back to heating. Therefore, if the temperature can be reduced coil troubles can be greatly decreased. Since the heating of a d.-c. coil will vary as the square of the voltage, and the heating of an a.-c. coil will vary about as the cube of the voltage, it follows that coils should be wound for the voltage that exists on the line.

Preventing Coil Burnouts. When an a.-c. magnet, such as a solenoid, is supplied with constant-voltage excitation it requires a large inrush of current to close the armature. When the armature closes the coil current drops to a normal value. Sometimes armatures may not close because of excess friction, or for some other reason, and the large inrush current may burn out the coil within a few seconds.

Such mishaps can be prevented by the use of a thermal cutout to protect the coils. When the thermal cutout opens because the armature fails to close, it is merely necessary to replace a small link made of two pieces of metal held together by a low-melting-point solder.

Relays. A number of relays have been designed to operate as a function of time. The one that was designed first was the dashpot type. Movement of a solenoid armature is retarded by means of a dashpot, giving a time-current relation that is called an inverse-time characteristic.

A dashpot is essentially a close-fitting device that is easily affected by dirt, gumming of the oil, and corrosion of the close-fitting parts. Also, the torque of the magnets varies with the position of the solenoid armature in its coil.

If trouble is experienced due to tripping while starting a motor, or shortly after the motor gets up to speed, three things can be done:

1. A heavier oil may be used if the relay almost holds.
2. A starting contactor can be used that does not include the overload relay in the circuit. After the motor is up to speed, the running contactor can close and the starting contactor can open, connecting the overload relay into the circuit. This is a rather complicated method, but it is sometimes used.
3. The final alternative is to replace the dashpot with a temperature type of overload relay. This is one of the reasons why temperature-type overload relays were originally developed.

Temperature Overload Relay. Since the function of a temperature overload relay is to protect a motor under all ambient temperatures, its final temperature should be the same as that of the motor —which is 90 C. If a relay does not function correctly, it should be immersed in a pail of water kept at 90 C. and adjusted so that it will. The adjustment should not be made by bending the "thermoflex" strip. If this method of checking or adjustment does not provide the necessary degree of protection to the motor, it can be assumed that the size of the relay heater is not correct.

A temperature overload relay should not be put in a strong draft, such as that from a window or a circulating fan, unless it is shielded by a cover. Conversely, it should not be located above a source of heat, such as steam pipes.

Time Delay Relay. The third type of relay is used for controlling the rate of acceleration of motors and for many other functions where a short time delay is needed. In the escapement type of relay, a pendulum is used as the governing means, which makes it necessary to mount the relay in a definite position with respect to the motion of the pendulum. To overcome this limitation a new design that has a balanced pendulum has been made available.

Know The Equipment

Control equipment can be quite simple or very complex, and the job of the maintenance man is easier if he has available instruction books and wiring diagrams covering every piece of control and every circuit for which he has responsibility. Extra coils and contact tips should be kept on hand as well as a complete list of spare parts.

Maybe This Will Solve Your Storage Problem

Plywood storage bin developed for grain could be used by food manufacturers for various products and materials. Low in cost and simple in construction, it is made of nonscarce materials

WITH the production of agricultural products and processed foods hitting a new high this year, a problem of storage space faces both the producer and the processor of foods. Ordinarily, additional facilities could readily be built. But wartime restrictions on construction materials complicate the problem. Ingenuity must be shown in the utilization of nonscarce materials. And such ingenuity already has been demonstrated by the department of agricultural engineering at Kansas State College. The engineers at Kansas State have designed a grain bin constructed of plywood and supported on a concrete foundation. Though designed for grain storage, this bin could be used by food manufacturers for many types of products and materials. It would be suitable for storing dry products such as beans and nuts, for example. And it would afford protection from the weather to various supplies and materials. Its design could, of course, be modified to adapt it to a particular purpose.

Having a capacity of 1,000 bu. of grain, the plywood bin is 14 ft. in diameter and 8 ft. deep. It has been constructed at a cost of $136 for materials and 16 man-days of labor. The bin has been called a plywood "barrel." The circular side walls are built of plywood panels and curved around three laminated plywood hoops. The cone-shaped roof is of plywood segments and the floor is of plywood or board flooring supported by wood sills and a concrete foundation.

Details of construction can be varied, but plywood bins erected in California are constructed on four 6-in. concrete sills. Planks are laid across these sills, with 3-in. spacing between them. Then the three plywood hoops to which the sides and roof are fastened are fabricated on the planks. The hoops are made of four layers of $\frac{3}{8}$-in. plywood $3\frac{1}{2}$ in. wide, glued and nailed together and held by clamps at the joints until the glue is dry. The hoops are formed inside of a jig made by nailing blocks to the planks over the concrete sills.

After the hoops are completed, the roof framework is attached to one of them. Rafters measuring 2x2 in. are nailed at one end to the hoop and at the other end to the sides of a metal

ventilator which forms the peak of the cone-shaped roof. Then the three hoops —one at the bottom, one at the top (with the roof framework attached) and one in the middle—are put in place and held by temporary inside supports. The structure is now ready for the side walls, which are formed on the ground in a 42-ft. strip from all-weather fir plywood panels. Nine panels, 4x8 ft., and two panels, 3x8 ft., are put together, and a 4-in. strip of plywood is glued and bolted over the edges where the panels butt together. This long strip is then picked up by four men and "wrapped" around the three hoops. The hoops are coated with glue before setting up the side walls, and the walls are nailed and bolted to the hoops after being put into position.

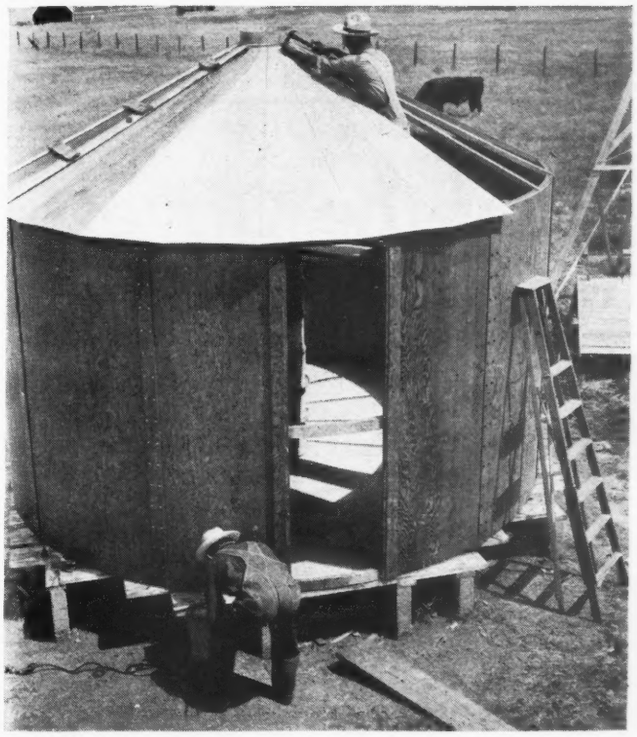
Next, the plywood segments that form the roof are cut and nailed and glued into place, weather-resistant glue sealing the joints between the segments. A weather cap placed over the ventilator completes the roof.

The opening for the door is framed with 2x4's, and short boards are cut to put across inside the opening. The door itself is made of plywood, shaped to the curve of the side walls by glueing it to laminated plywood crosspieces which have been curved in a jig.

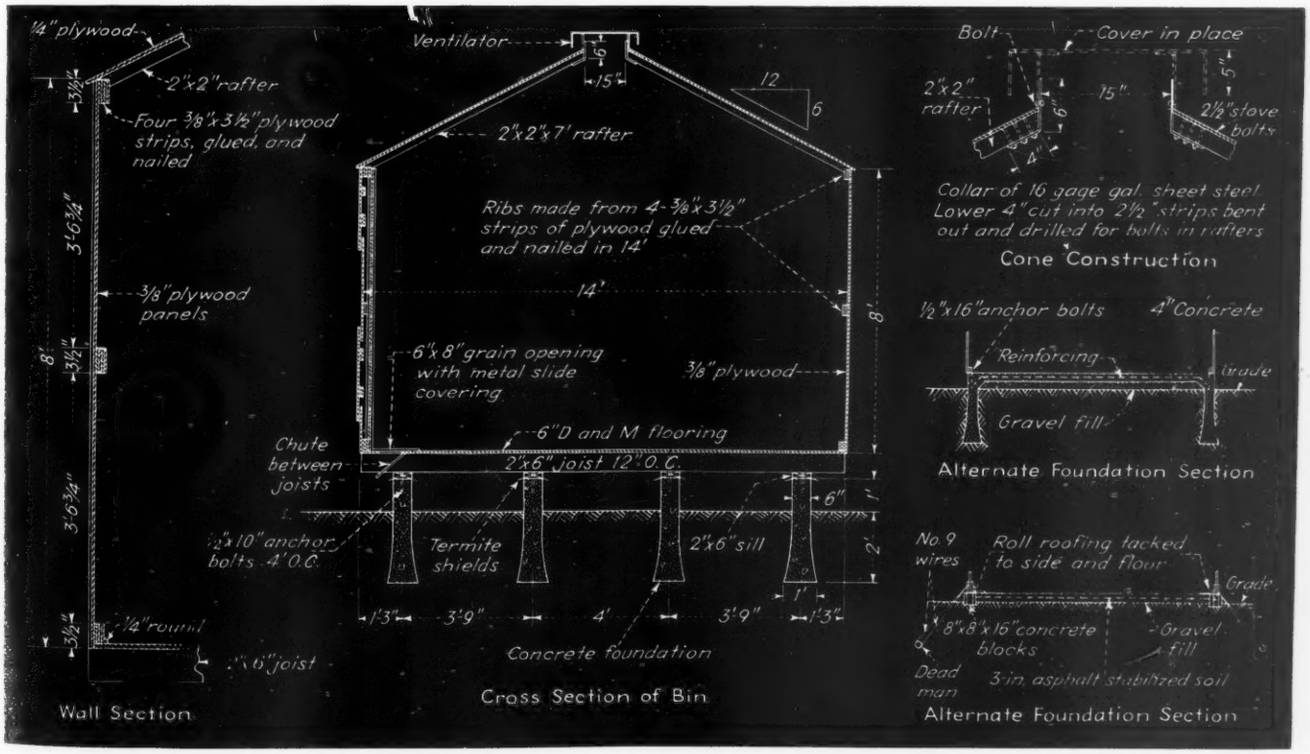
One type of floor is made of ¼-in. plywood laid on 2x2-in. sills placed crosswise of the planks that are put over the concrete foundation sills. And for ventilation, narrow slits, 3½-in. long and about ½ in. apart, can be cut in the floor with an electric handsaw. A second type of floor is made of 6-in. flooring laid on 2x6-in. joists supported by the concrete sills. Alternate types of floor and foundation construction are: (1) 4-in. reinforced concrete laid over a gravel fill, and (2) a gravel fill covered with 3 in. of asphalt-stabilized soil bordered by a ring of 8x8x16-in. concrete blocks.

The side walls of the bin are finished with raw linseed oil and varnish, and the roof is painted.

Octagonal-shaped plywood bins are another type of construction, the plywood panels being placed inside the studding. This construction, of course, is not as smooth looking as the circular type.



This plywood bin is one answer to the problem of increasing storage facilities for food products. Originally designed for grain storage on farms, it could be used by food manufacturers for various products and materials.



Construction details and dimensions for plywood storage bin designed by the department of agricultural engineering, Kansas State College.

How the Government Buys Foods

By H. C. ALBIN
Chief, Purchase Branch, Agricultural Marketing Administration, U. S. Department of Agriculture, Washington, D.C.

Every day AMA moves from 700 to 1,000 carloads of products, primarily processed foods, to seaports for shipment. Pointers on how to get some of this business and how to meet the requirements are given in this article

H. C. ALBIN

MOST of the commodities being delivered by the Agricultural Marketing Administration for shipment to the United Nations are processed foodstuffs. Cargoes of canned, dried and dehydrated foods are being shipped in volume, not only to British ports but also to Hawaii, Puerto Rico, Africa, Persia, Australia and other destinations. Shipments of flour, fats, canned meats and other processed commodities are "getting through" to the hard-pressed Russians.

Every day the Agricultural Marketing Administration is moving from 700 to 1,000 carloads of products, primarily processed foodstuffs, from interior assembly points toward Atlantic, Pacific and Gulf ports. More than 300 different types of commodities have been purchased; and the list is growing.

Several thousand American manufacturers and food processors have participated in converting and packaging the $1,500,000,000 of commodities that AMA has purchased so far. More than half of that amount has been delivered to representatives of the Allied Nations for shipment.

How Purchases Are Made

AMA does most of its buying according to specific announcements, under the "offer and acceptance" plan. Announcements from the Purchase Branch go out by mail or wire to processors and marketing organizations in the particular food industry concerned. Newcomers wishing to make offers should write directly to the Purchase Branch to be placed on announcement mailing lists.

The purchasing procedure is set up for direct and immediate action. Offer forms and specifications needed in making bids go out with the announcements. Offers that are accepted become contracts then and there, based on the terms set forth in the announcement. In most instances, back-checking with the processor, or in-between steps, are not needed to complete the contract.

The initials "FSC" or "FSCC" appearing on most announcements refer to the Federal Surplus Commodities Corp., an agency of the United States used by AMA as its purchasing agent.

Here are some of the items from an announcement to purchase dried skim milk (FSC 785):

Number of cars and pounds offered, grade and process; container specifications, and barrel or drum markings required; point at which delivery will be made; name of originating carrier at each delivery point; dates on which product will be ready for sampling, and for delivery; quantity units in which delivery may be made, and tolerance allowed; detailed quality specifications for both "Extra" and "Standard" grades, based on standards of the American Dry Milk Institute; explanation of when and how the product will be inspected and graded, and vendor's responsibility for loading, bracing, and blocking carload shipments in conformance with methods of the Association of American Railroads.

Hints on Making Offers

Here are some suggestions—already appreciated by companies familiar with AMA purchase procedure—which may be helpful to processors submitting offers for the first time.

Read announcements carefully. Give the facts on every point requiring specific information. When announcements are not accompanied by forms for listing information, and contemplate response by letter or telegram, list the facts in 1-2-3-4-fashion as the points appear in the announcement.

Get offers in on time. Most announcements have a specific deadline, usually midnight on a certain date. Hundreds of offers may be coming in for routine listing early next morning. A delayed offer may be too late. Know your mailing time to Washington. When in doubt, wire the essential information.

Watch packaging specifications. Containers and methods of packing which were satisfactory for peacetime orders and internal shipments may not be acceptable for many products bought for ocean shipment or for the rough handling that wartime cargoes may get.

Know your price ceilings, and don't

WHEN IN DOUBT

Rapid-fire changes in the overseas military situation may necessitate corresponding changes in AMA food buying. If you haven't followed the purchasing announcements regularly, or are uncertain about some point in the specifications, write, wire or directly notify the Purchase Branch, Agricultural Marketing Administration, Department of Agriculture, Washington, D. C.

bid above them. While prices of most agricultural raw commodities are below the levels at which price ceilings may be established under the price control act, the largest number of purchases for the Allied Nations consist of processed commodities either already under ceilings or for which ceilings may soon be established. For some processed farm products, such as cottonseed oil and soybean oil, OPA has fixed specific ceilings for all merchandisers. But for other commodities each merchant or processor has his own individual ceiling as determined in accordance with the maximum price regulation. While the determination of ceiling prices in such instances is the responsibility of the individual seller, obviously AMA cannot accept offers which are in violation of ceiling orders.

Allow adequate time for delivery of the commodity. Announcements state the time that can be allowed for delivery. After an offer is accepted the product must be sampled for grade and inspected for other requirements, loaded and shipped. Freight and storage must be booked in advance. Cars and ships can't wait for delayed consignments. Many contracts contain a liquidated damage clause applicable if delivery is not made within the contractural period, and therefore it is important to deliver *on time.*

Where there is continuous need for a commodity, the Purchase Branch has a standing announcement providing for periodic purchases. For instance, as of August 1, and until further notice, processors of dried skim milk may submit offers on the first and third Tuesdays of each month, and the Purchase Branch is committed to send wires by midnight the following Thursday—48 hours later in each case—to all processors whose offers are accepted.

Other commodities being purchased periodically are designated meats and canned fish products, fish-liver oil, dried eggs, dried whole milk, evaporated milk, sweetened condensed milk, American cheese, canned processed cheese, dried peas and beans, canned tomatoes, canned tomato paste, canned peas and concentrated orange and lemon juice. From time to time there will be others.

Quality Specifications

AMA provides detailed quality specifications for all food commodities being purchased for the Allied Nations and for other needs. There is close cooperation with the armed forces in providing specifications, so that commodities acquired by AMA will be available for United States military purposes. AMA purchase announcements specify U. S. grades and standards in all cases where they are in existence, although in some instances the requirements may be more specific than the customary standards. This may be necessary because of unusual transportation or storage conditions, or because of special wartime needs of the allied country making the requisition. Purchases are inspected by Federal or Federal-State inspection services, under AMA supervision, or by special inspectors designated by the Administration.

Packaging Specifications

The words "suitable for export" in the packaging specifications for many AMA purchases are a constant reminder that products are destined for overseas duty. However, in view of the scarcity of many container and packaging materials, the specifications are being drawn to permit the widest possible variety types of packaging consistent with the purpose for which the product is purchased.

Thus, an announcement to buy canned cut green beans permits No. 2, 2½ or 10 size cans meeting the requirements of Grade C or better, as defined by U. S. standards. In another instance, specifications for buying 1,800,000 lb. of jams and marmalade state that "screw top, friction top or other standard commercial closure is acceptable."

Blanket specifications for cases used in packing canned foods (FSC 1539) provide three general commercial types: A-type, weatherproof solid-fiber boxes; B-type, wirebound wood boxes; and C-type, nailed wooden boxes. Each major type has a number of sub-types so as to allow a range in sizes and materials. In making offers, processors familiar with the specifications simply cite the type-number to save paper work and telegraph costs.

A limited number of announcements involving commodities for which packaging materials are very scarce specify that vendors who obtain contracts will be assisted in securing priorities in connection with purchases of materials required for completing the contracts.

Advantages of the Offer-and-acceptance Method

There are two main reasons for using the offer-and-acceptance purchasing method: (1) To provide greatest efficiency in large-scale purchasing, and (2) to create the broadest and most equitable market possible for government purchases. In private business it is customary to buy commodities at announced prices, or by negotiation. While negotiated purchasing holds many advantages where such factors as style and customer-preference are important, it is difficult and cumbersome for the government to admin-

Official U. S. Navy Photo

Bluejackets of the Navy keep constant watch over ships in their convoy as they cross the gray waters of the North Atlantic. The fact that ships carrying foods move in convoys is one reason why food manufacturers must make deliveries to the government on time. A whole convoy cannot be delayed by one ship waiting on a consignment of, say, canned tomatoes.

U.S.D.A. Photo by Forsythe

Cheese made in the United States goes down into the hold of a ship that will take it from a North American port to England.

ister in large-scale purchasing, and is constantly open to the charge of discrimination or favoritism. If flexibly and properly administered, the offer-and-acceptance method is more competitive, and also more economical and efficient, even where purchases are made in a relatively limited area or commodity field.

The market created by the wartime needs of the United Nations is a new market, but it is the nearest thing to an open, competitive market that the Department of Agriculture can provide. It is like other markets in the sense that it must be studied and its needs understood by those doing business in it. It is like other markets in that sellers must display their wares and make their offers on many occasions. The force of competition will mean that many individual offers will not be accepted, but it should help to give assurance that the market will continue to be open to all qualified sellers. Since invitations go to all members of the trade on record, in a sense processors are themselves setting the terms under which American products are being sold for overseas shipments, subject of course to government supervision and price regulation.

Purchases at Announced Prices

AMA is buying a limited number of commodities at announced prices. Like the offer-and-acceptance purchases, those at announced prices are made according to public announcements and uniform specifications. Most such purchasing is being done for price-support purposes, either to encourage the production of items in short supply, or to speed the marketing of perishable fruits and vegetables which may be wasted if prices are not adequate to justify moving the crops to city markets.

The announcement of a program to support the price of a commodity at a specified level does not necessarily mean that AMA is ceasing to purchase the commodity on an offer-and-acceptance basis. It is sometimes necessary to change the emphasis in purchasing from one method to another because of quickly changing military requirements. If, for instance, a commodity is urgently needed, and the going market price has increased above the announced support price, the purchasing may be done on an offer-and-acceptance basis. In some instances, purchasing by both methods has proceeded simultaneously.

Any processor who is interested in making an offer and is uncertain whether the product will be purchased at an announced price, or on a competitive price basis, should communicate directly with the Purchase Branch, Agricultural Marketing Administration, Washington, D. C.

Although most of the butter, cheese and processed milk being purchased currently is obtained from processors on the offer-and-acceptance basis, the Department of Agriculture is also committed to buy these products at announced prices as a means of diverting production to meet changing wartime needs. In order to stimulate butter and cheese production, AMA on July 21, 1942, increased the announced support prices for these commodities—to 39 cents a pound for 92-score butter, Chicago basis, and to 21 cents a pound for U. S. No. 1 cheese, Wisconsin Cheese Exchange basis.

At the same time the announced prices for roller-process dry skim milk and evaporated milk were decreased; and the announced price for spray-process dry skim milk was increased to correspond with the growing demand for this commodity among the Allied Nations.

Canned Vegetable Program

So far most of the canned vegetables for the allied nations and for other requirements have been purchased on the offer-and-acceptance basis. In the months ahead, however, many purchases probably will be made according to the terms of a special program recently announced by the Department of Agriculture. The purpose of this program is to secure adequate production of canned vegetables at reasonable prices, and provide outlets for crops that growers have already contracted to produce. Under the program, which has been worked out with the Office of Price Administration, the Agricultural Marketing Administration will pay specified prices to canners for 1942 packs. The program applies to 10 vegetable crops: Canned asparagus, lima beans, snap beans, beets, sweet corn, carrots, peas, spinach, tomatoes and tomato juice. Canned pumpkin and squash may be added.

Under this arrangement, the Agricultural Marketing Administration will purchase these canned vegetables at 92 percent of the canner's individual maximum prices as determined by Office of Price Administration regulations, subject to certain limitations on the basis of area average maximum prices. The support prices will not exceed 95 percent of the area average maximum price to canners for each grade, size, style or type of each vegetable.

AMA is buying some foodstuffs directly from farmers, farmers' markets and wholesalers, particularly to relieve local oversupply problems in fresh fruits and vegetables. To accomplish this, the Purchase Branch may set up an office in the area and keep its buyers at the markets.

Some of the problems of oversupply in perishable products are being solved without the need for direct price sup-

port. By featuring Victory Food Specials, such as peaches and certain types of poultry, AMA is encouraging housewives to buy the abundant foods in larger quantities. This will help to relieve the pressure on other commodities urgently needed for military uses.

Reports of Purchases

To let agricultural and trade interests know as quickly as possible what has been purchased, and to keep the general public informed, AMA issues a series of purchase reports. This job is done by the Marketing Reports Division. These reports tell who sold what, when, where and for how much. May processors are following these reports closely to keep up with price trends and competitive conditions in the wartime food market. Except in a few, relatively unimportant, instances where the location or movement of a particular commodity must be kept secret from the enemy, every AMA purchase is publicly reported.

1. *Daily purchase report.* Probably most widely known among processors, this report lists for each purchase the vendor, f.o.b. point, type of packaging, quantity, grade in some instances, and price paid per unit. Issued nearly every day in the week, the report is mimeographed in the Marketing Reports Division, released to the press, and mailed to hundreds of processors. The report comes out in three editions: (*a*) Meat and fish, (*b*) dairy products and eggs, and (*c*) miscellaneous. The miscellaneous edition includes fresh, canned, dried or dehydrated fruits and vegetables, fruit concentrates, other food products, naval stores, cotton and other commodities. In asking to be placed on mailing lists, firms can avoid delay, and help save waste and duplication in government mailing, by specifying the commodity or commodity group in which they are interested.

U.S.D.A. Photo by Forsythe

Piled up in warehouses near the waterfront of a big American seaport, barrels of milk powder await the ships that will carry them to Great Britain.

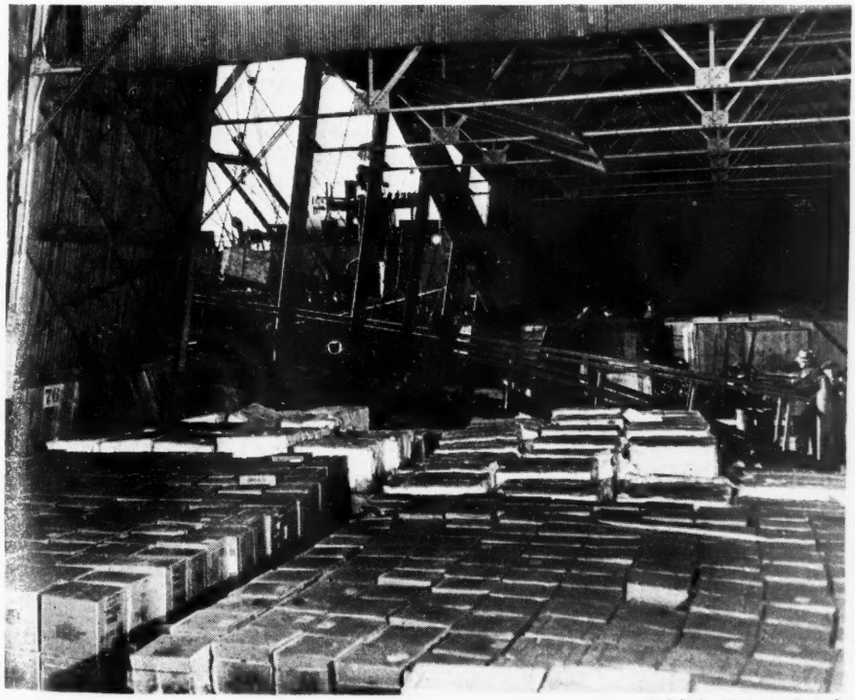
2. *Abbreviated daily report.* This is not mimeographed for general distribution, since it is made up primarily for the needs of press and trade correspondents in Washington. It is wired to about 45 Agricultural Marketing Administration field offices.

3. *Weekly report.* This shows aggregate quantities purchased during the week, by commodities. It is intended primarily as a convenient summary to inform processors of purchasing trends, particularly in instances where the detailed purchase reports are not needed.

4. *Monthly summary report*—issued as a USDA press release, showing the volume of purchases during the month, by commodities, and the f.o.b. cost. The report also shows the cumulative quantity, and the cumulative f.o.b. cost, since March 15, 1941, when the program started.

5. *Delivery report.* It shows the cumulative quantity of deliveries, by commodities, for overseas shipment. It is issued as a press release, with a lag of 30 days from the delivery date to the release date to avoid giving out information at a time when it might be useful to the enemy.

Last year, before American factories had converted to mass production of war materials, and armaments on hand



U.S.D.A. Photo by Forsythe

Food products of the United States—spiced ham (left) and dried apples—wait on a pier of a North American port to be loaded onto a ship that will carry them to Great Britain.

sometimes weren't enough to fill the holds of waiting vessels, the Department of Agriculture stood ready to complete the cargo of any ship. The Purchase Branch of the Agricultural Marketing Administration is proud of the record that no ship has been kept waiting longer than has been necessary to rush foodstuffs from a nearby warehouse.

Food a Powerful Weapon

The cooperation of American farmers and food processors is making it possible to do the job. Food-for-Freedom, which only last year was little more than the expression of an American ideal, is today one of the strongest weapons issuing from the arsenal of democracy.

Truck Design Promotes Product Nationally

National Dairy adopts uniform paint and lettering layout for trucks of all companies in the "Sealtest" system, enabling each to capitalize upon the good will of the others

THROUGH cooperation between the National Dairy Products Corp. and its milk and ice cream operating subsidiaries, a new standardized truck painting and lettering layout has been adopted to provide a uniform identification to enable individual units to capitalize on the good will established by other units or sister companies.

It is felt that especially under war conditions, there is a considerable migration from city to city among milk customers and also large numbers of transients who are good ice cream customers. It is further felt that immediate identification of the operating company as a member of the National Dairy Products family through the uniform painting of its great fleet of motor trucks will be a most important sales asset.

The design has been several months in the course of development but vehicles painted in the new manner are now appearing in large numbers in several cities throughout the United States.

The basis of the new vehicle design was an attractive ice cream package which most of the National Dairy ice cream manufacturing companies had previously adopted.

That package was worked out in three colors—red, white and gray. The red is a brilliant hue, used for the "Sealtest" symbol that identifies those products of all National Dairy subsidiaries which are produced under the Sealtest system of laboratory protection.

The gray color used is one developed especially for Sealtest. It contains a touch of red to give life to the color and overcome the drabness usually characteristic of gray.

The new truck design uses the same three colors arranged in an ingenious and pleasing manner as shown in the accompanying illustrations.

Under the direction of E. E. Stewart, the Rieck-McJunkin Dairy Co. of Pittsburgh, which operates branch plants throughout western Pennsylvania, was among the first to adopt the new design. J. J. Laher, Rieck's manager of transportation, worked out the details of painting and lettering for the program.

One of the most important characteristics of the new design is the substitution of gray for the cream or white base color which until now has been almost universally used on milk trucks and perhaps to only a slightly lesser extent on ice cream trucks as a symbol of cleanliness and purity of product.

While cream and white paints have been hard to keep from fading under the action of the sun and the elements, most dairy and ice cream companies have continued to use them year after year because of the long association in the public mind of those colors with first-class milk and ice cream companies.

However, to this observer, who has seen the new paint jobs on the street, they sacrifice nothing in appearance, cleanliness or association of purity of product as compared with the old cream or white paint jobs. While the accompanying illustrations give a fair idea of the appearance of the trucks painted in the new manner, the trucks really have to be seen to be appreciated.

In layout, the overall gray of the body is relieved by two rectangular blocks of color on each side and on the rear. One block is white and the other the bright Sealtest red. On the right side of the body, the white block of color is located at the upper rear corner.

On the left side of the body, the similar white block is located at

THE OLD

The old painting and lettering layout on a typical milk truck owned by the Rieck-McJunkin Dairy Co., Pittsburgh, Pa. The body color was cream with the roof, motor hood, fenders and wheels all black. The layout has been replaced by the new standardized National Dairy Products design shown in the illustrations on the opposite page.

the upper front corner. On the rear, the white color extends clear across the back from the panel belt molding to the rear roof rail.

In each position, the Sealtest red color block overlaps part of the white block, the lower inside corners on the sides, and the lower center on the rear. In each instance, the red block is lettered in white either "Sealtest Milk" or "Sealtest Ice Cream," depending on the product carried in the truck.

The upper half of the white block on the sides and rear is reserved for the company name, which is lettered in the same gray as that used on the body proper. The Sealtest insignia in red and white is placed on each side of cab door.

The entire windshield frame, cowl, motor hood, step splasher, headlights and front and rear fenders are painted the same gray as the body.

The accompanying views show a typical milk and ice cream truck as used by Rieck's and a Chapman cab-over-engine Ford milk truck. These views show how the individual company name is worked into the standardized lettering scheme.

Also of interest is the difference between the old and the new Rieck designs, shown in the accompanying illustrations. The old Rieck layout used a cream color for the body proper with the cowl, motor hood, front and rear fenders and the roof all black. The lettering was green with a red outline.

In contrast, black has been eliminated in the new design, even the fenders being gray. While the light-colored gray fenders undeniably fit into the overall appearance of the truck, they will undoubtedly be more expensive to maintain than black fenders since it is difficult to match up the color in touching up fender dents and scratches.

Because the cases of milk are iced in the summer and because black paint tends to retain rather than reflect the heat of the sun's rays, the substitution of a gray roof in the new design for a black one in the old will be a decided improvement.

In construction, the Rieck bodies are covered with Galvanele metal panels over which a zinc primer containing the Sealtest gray is sprayed. The name "Rieck's" and the Sealtest emblems are applied as decalcomanias furnished by the Meyercord Co. The insides of the bodies are sprayed with aluminum. The finishes used are Ditzler.

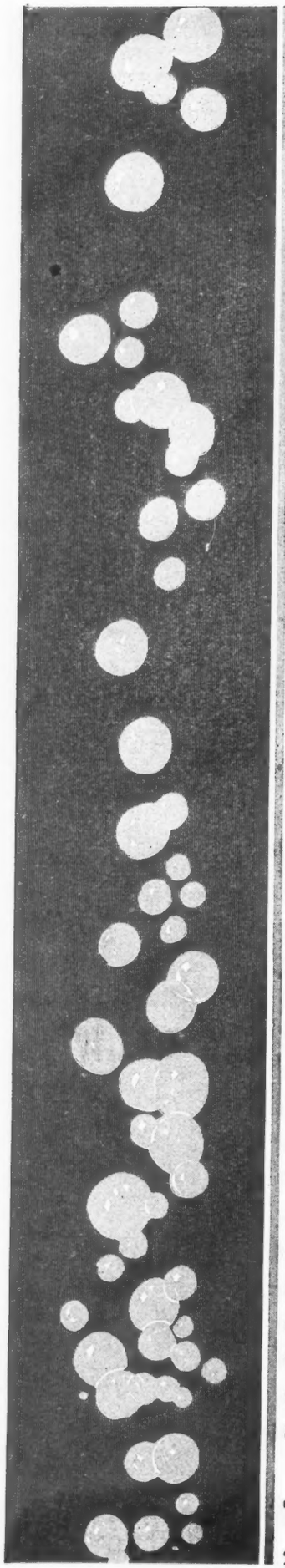
The Chapman milk truck body shown is of Lindsay Structure lightweight construction and built by the American Body & Welding Co., Kansas City, Mo. It is insulated all around with 3 in. of Dry-Zero.

A typical Chapman milk truck in the new standardized dress. It has a Lindsay Structure insulated body.

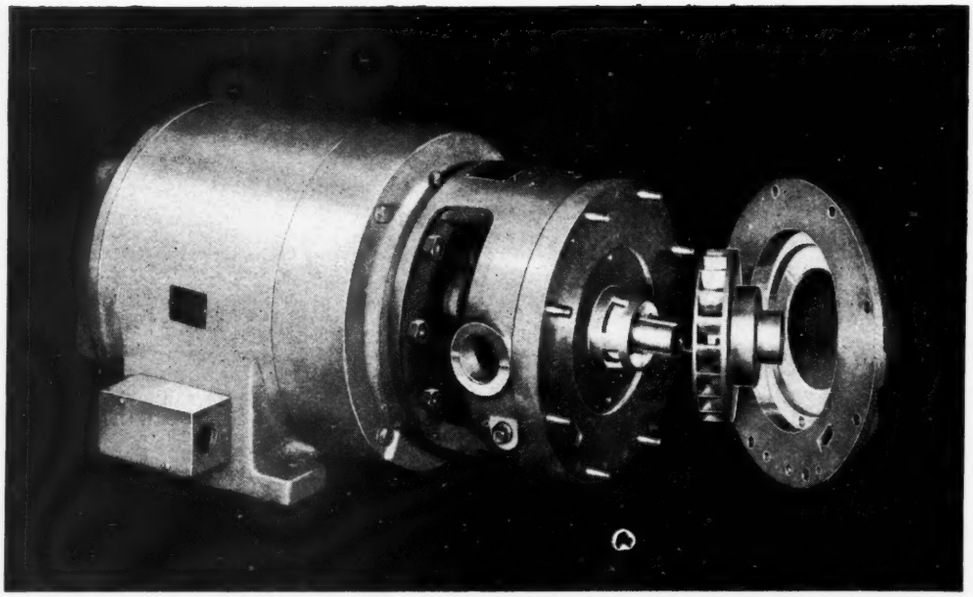
Close-up of one of the newly painted Rieck milk trucks showing the side and rear lettering layouts and one of the "Sealtest" emblems on each front door.

THE NEW

Three examples of the new National Dairy standardized paint and lettering layouts. At the top and center are milk trucks of two different operating subsidiaries. Directly above is a Rieck ice cream truck.



ONLY CLEAN AIR CAN REACH YOUR PRODUCT FROM A NASH COMPRESSOR



Here is a compressor designed perfectly to meet the needs of the Food Plants. It is simple, for it has only one moving part, a rotor cast in one piece and rotating in the casing without metallic contact. This means trouble-free operation over long periods. It is compact and requires little valuable floor space. Its oversize ball bearings seldom require attention or lubrication. No lubrication is required in the interior, so that the air is kept clean from the time it enters the pump. • But this is not all. The compressing medium in the Nash Pump is a rotating column of clean water. The air is in intimate contact with this water in passing thru the pump and is actually scrubbed while it is being compressed. Dust present in the atmosphere is removed, and the air delivered free from dirt, oil, or heat, without the use of scrubbers or air washers. Think what this means in terms of purchase cost and floor space occupied by complicated air washing apparatus. • These pumps are proving their worth in the most trying service. They are ideal for transferring beer or wort from tank to tank by air pressure, for maintaining pressure on aging tanks, for supplying compressed air to bottling machines in racking, etc. • Available in any capacity, these pumps deliver pressures up to 40 lbs. absolutely uniform without storage tanks. • You want the most reliable pumping equipment in your plant, so by all means find out more about the Hytor. Our catalog No. 217 is free on request.

THE NASH ENGINEERING COMPANY

243 WILSON ROAD • SOUTH NORWALK, CONNECTICUT

NEW PACKAGES & PRODUCTS

Pastry Sticks

CHOCOLATE cream filling in a long, thin pastry stick is now being offered by Roll Biscuit Co., New York, under the name of "Robisco." The dessert biscuit, made with chocolate, shortening and roasted hazelnut paste, contains sugar, flour, egg-yolk, milk, salt, shortening and vanilla. The delicious, wafer-thin biscuits are an equally good accompaniment to desserts or cocktails. Robiscoes are packed in an 11 oz. red tin with an attractive label.

Sugar-Ration Bags

AMERICAN MOLASSES CO., through its subsidiary, Sucrest Corp., New York, has introduced a new 5-lb. kraft paper bag for sugar rations. The package facilitates sales by enabling grocers to sell single packages in return for rationing tickets. The sturdy bag, printed in two colors, has a special easy-to-pour feature.

Sucrest's label extols the virtues of "Grandma's Molasses" as a wartime sweetener and body-builder. Sugar-saving recipes on the side panels of the bag and the offer of the new "Grandma's Molasses Recipe Book" are expected to stimulate sales of the molasses. The timely package gives the public practical information on how to extend sugar rationing tickets and also profits the company.

Proof of the Pudding

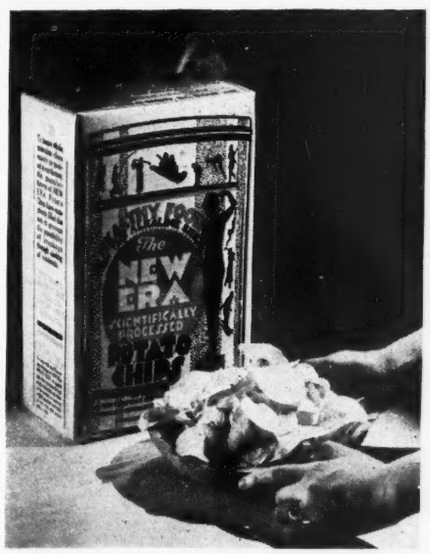
GARDEN OF THE SETTING SUN, Mecca, Calif., has developed a new package for its "Date Plum Pudding," formerly packaged in tin. The pudding, still in the muslin bag in which it was steamed, is wrapped in heavy waxed paper, stapled at the top, and circled with a cardboard band carrying a printed label.

The new package includes a 1½-oz. screw-cap glass jar of diced dates in sirup, champagne-type brandy and wine, which may be used for spreads, sauces, fillings and toppings. The pudding and

the small jar have a yellow cellophane outer-wrap which attracts consumer attention.

Chips in Paperboard

SCIENTIFICALLY processed potato chips, manufactured by Nicolay Dancey, Inc., Detroit, are packed in a 1-lb. corrugated paperboard container with an outside ply of special-finish heavy paper. A



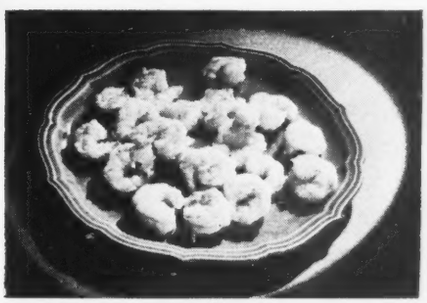
cellophane outer wrap seals the package.

The "New Era" potato chips, made from selected potatoes processed in hydrogenated vegetable shortening with salt added, are tightly packed in an inside bag of heavy waxed glassine. The box is completely filled to prevent the possibility of breakage through shaking of contents.

Dulany Deveins Shrimp

COOKED, seasoned and deveined shrimp, product of John Dulany and Son, Exmore, Va., is destined to become one of the most popular of frozen foods. The product is a boon to the housewife as it does away with the tedious task of removing the veins by hand.

In the Dulany operations, the shrimp are placed, after peeling, in specially designed holders and are cut down the back exposing the "sand vein." The veins are removed completely by use of special rotary brushes. The shrimp are then washed preparatory to cooking. A special cooking and seasoning treatment has been developed by the



company to provide a mild appearing flavor and a distinct tenderness, and to retain these characteristics after prolonged storage. Following the cooking the shrimp are cooled and thoroughly drained prior to packaging and freezing.

Bananas Are Available

WITH fresh bananas on the luxury list, the dried ripe bananas brought out by Sanib Corp., New York, have a ready market. The product is manufactured at Sanib Corp.'s modern dehydration plant in Puerto Cortes, Honduras. Naturally ripened, the bananas are processed at the peak of ripeness, and packaged in 1-lb. lots in a cellophane wrap.

From the nutrition angle, the product retains all mineral values of the fresh fruit,—calcium, iron, copper and phosphorous. Only the moisture is removed. Each pound of dried bananas contains between 15 and 18 whole bananas, and retails at a price below the current price of fresh bananas.

Which would Your Wife Choose?

MULTIPLY YOUR ANSWER by 32,000,000 HOUSEWIVES . . . then see the Tremendous Sales Opportunities Vitamin Reinforcement Offers You!

The future of your business will be decided by the housewives of America! Educated by a barrage of articles in the womens' magazines, in newspapers and over the air, today the Government Nutrition Program has convinced your wife and every alert housewife in the country to look for vitamins on labels when they buy.

What a sales opportunity this has opened for wide awake food manufacturers!

To cite but one example of what vitamin enrichment has done for food product sales, take a look at the amazing vitamin success story of enriched white bread. A year ago it was hard to find an enriched loaf. But today, every two loaves out of three are enriched. And the time is fast arriving when 100% of the white bread in America will be enriched.

Add this success story to those of cereals, family flour, and the many other food products being fortified today, and you begin to see the tremendous selling power behind vitamin enrichment. It's making big sales gains for food manufacturers every day. Think what it could do for you!

Find out which of your products can be enriched now with the greatest sales advantage. We can advise you and give full information—how to enrich, the new low costs and the many benefits to you. We pioneered in vitamins and today manufacture a high percentage of the nation's vitamin B_1, B_2, C and niacin requirements. Write today for technical information and get this vital selling force working for you.

Hoffmann-La Roche, Inc. VITAMIN DIVISION NUTLEY, NEW JERSEY

FOOD INDUSTRY NEWS

GENERAL NEWS • TRENDS • JOBS • COMPANIES • OCTOBER, 1942

Technologists Reveal New Knowledge About Foods

Report recent discoveries and suggest answers to wartime problems in papers at ACS meeting

SOME very significant technical facts and points of progressive wartime policy for the food industries were brought out in papers presented at the meeting of American Chemical Society in Buffalo last month.

An important point of policy—one now recognized by leaders in the food industry was emphasized by Col. Paul E. Howe, Office of the Surgeon General, U. S. Army: "The canners, meat packers, the frozen food industry, and other industries concerned with food preservation, are called upon to establish by research the effect that processing methods have on the nutritive value of food. It is not sufficient for the food processor to produce an attractive product alone; it is equally important to conserve the maximum nutritive value of the natural product."

Packaging for the AEF

In discussing the packaging of food for overseas use, Capt. Robert R. Melson, U. S. Quartermaster Corps, Subsistence Research Laboratory, Chicago, gave these specifications: "The packaging materials must withstand temperatures from 20 deg. F. below zero to 120 deg. F. or higher, and humidities at both extremes. Protection must also be provided against insect infestation, rats, toxic war gases and other hazards. Much unloading will be carried out under cover of darkness, possibly in a surf, and supplies may be left on the bench and exposed to tropical rains. Cases of food will be subjected to much handling in their long journey, which under battle conditions will be anything but gentle. . . . Corrugated cartons have no place in overseas shipments. Waterproof solid fiberboard has fairly good resistance to rain and high humidities. However, it is none too satisfactory and is used sparingly.

"Nailed wooden boxes and wire-bound boxes have given the most satisfactory performance and are now preferred for overseas shipment."

Dehydration "Musts"

The *sina qua non* of successful dehydration were explained by Dr. W. V. Cruess, of the University of California. "Blanching must be thorough enough to destroy the enzymes responsible for the life processes of the vegetables and for the changes in flavor, odor, color and texture. Peroxidase is one of the best enzymes for use as an indicator of adequate blanching; if it is destroyed, as shown by the customary test with guaiacol and hydrogen peroxide, the product will keep well; if only catalase is destroyed and the peroxidase survives, then the product may not keep well. Therefore, those who advise that blanching until the catalase test is negative but the peroxidase test still positive are in serious error. Blanching is best done in steam; not in water, as the later removes vitamins and other water-soluble food values.

"Garden freshness has been shown to be essential to good quality and to high vitamin content. Vitamin C is lost rapidly after the vegetable leaves the garden.

"Drying to extremely low moisture content is cardinal principal number two; blanching is number one. Most vegetables should be dried to below 5 percent moisture content for best keeping quality.

"Usually 140 to 145 deg. F. is the finishing range. Some dehydraters get greatly increased capacity by operating at 180 deg. F. or thereabouts while the product is wet and finishing at 140 to 150 deg. F. In other words they use the parallel current system in the initial stages and the counter current during final stages of drying.

"Packaging is the other great problem of dehydrated vegetables. They are subject to spoilage by oxidation, etc., if they absorb moisture from the air, as is certainly the case in the tropics for products open. Secondly, insects dearly love dehydrated vegetables and will eat their way through cartons, cellophane and bags of various kinds, including laminated asphalt bags. So about all that can be done at present in a practical way to protect them for Army use is to pack them in metal containers or in glass. Packaging in nitrogen or carbon dioxide is advised in order to reduce the tendency of the products to oxidize. Production of drum-dried vegetable purees is a recent commercial development and spray drying may also come into its own for powdered juices."

Darkening of Orange Juice

Factors responsible for the darkening of packaged orange juice were discussed by Drs. E. L. Moore, W. B. Esselen, Jr., and C. R. Fellers, Massachusetts State College. They reported that the results of a study point to the fact that the decomposition of ascorbic acid (vitamin C) in packaged orange juice is directly associated with darkening.

The utilization of packing methods

WAR BOND SALESMEN

Milk bottles have been enlisted to carry the "Buy War Bonds" message into American homes, the Treasury Department has announced. The slogan is featured on one side of the bottle, with the name of the milk distributor on the other side. The design is applied by a high-temperature process in which the color is fused into the glass. Red and blue colors are usually used against the white background of the milk. The average bottle makes 35 trips to the home and is seen by several persons in the family.

and storage conditions which best prevent the oxidation of vitamin C are to be recommended as a means of controlling darkening in orange juice.

Vitamin from Paper Mill Waste

Cheaper vitamin B_2, a major factor in the fortification of flour, is possible through large-scale production of a rare sugar, essential to the vitamin's synthesis, from yeast derived from paper mill liquor now being dumped into woodland rivers, Dr. Jonas Kamlet, Miles Laboratories, Inc., New York, told the division of medicinal chemistry of the ACS. It was recently found at the National Bureau of Standards that D-ribose, a five-carbon sugar which until recently cost $18,000 a pound, can be isolated from ordinary baker's yeast. This yeast in turn can be made economically from sulphite liquor—waste from mills producing paper and pulp. Two plants in Canada are now producing low-cost yeast needed for the ribose-from-yeast process, and erection of similar plants in the United States after the war is contemplated.

Meager Diet Healthy

A healthy and happy life are possible upon very small amounts of food if this food is rich in protein, minerals and vitamins, according to experiments reported by C. M. McCay, W. T. James and L. L. Barnes, Cornell University, before the division of biological chemistry of the ACS. Experiments were made with puppies which were placed upon diets of natural foodstuffs eaten by man. The diets were of excellent quality, but the amounts allowed were so small that the puppies could scarcely grow, and remained very thin. The puppies were kept in unheated quarters a whole winter, but were never sick and were always full of life. When they were allowed all the food they desired they ate about twice as much as a normal dog for a whole month. Their final body size was about three-fourths that of a normal dog. Today, at a year and a half of age, they still behave like puppies. These studies indicate that mixtures of foods can be prepared for man that will keep him in excellent health for long periods even when he has a very limited supply of the ration. Furthermore, the food mixtures used can be stored for many months without spoilage since they are low in fats. In addition they indicate that the immunity to diseases that is commonly associated with fasting is not due to a low intake of vitamins, such as others have postulated.

Flour from cottonseed, soybeans and peanuts offers an untapped and economic source of proteins and vitamins for human consumption, Dr. Theodore F. Zucker, School of Medicine, Columbia University, and Dr. Louis Zucker, research assistant, reported at a symposium on vitamins and nutrition held by the division of biological chemistry of the ACS. "In any food stringency, these inexpensive seed flours will make it possible to save on meat and the less available fresh leafy vegetables. . . . It is certainly noteworthy that a huge and well-balanced store of B vitamins is associated with good quality protein in cottonseed, and good cottonseed flour is sold at 5 cents a pound.

BIG CORN PACK SEEN

The corn pack this year is exceptionally large, and canneries have been working at an accelerated pace to meet the huge goals set by the government at the beginning of the year. All of this Illinois corn was out of the field and into cans between sunup and noon, according to Can Manufacturers Institute. Such speed in moving the raw material to the plant and through the process contributes to high quality.

Issues More Standards For Fruit Cocktail

STANDARDS of quality and fill of container have been promulgated for canned fruit cocktail, and label statements of substandard quality and of substandard fill have been prescribed. The new standards, which are substantially the same as the proposed regulations, become effective November 16. Standards of identity for the product have already been issued by the Federal Security Administration (FOOD INDUSTRIES, September, 1942, p. 80).

Nutrition Program Works

THAT the National Nutrition Program is having some effect upon the eating habits of the country is indicated by a sample survey made in South Bend, Ind. This study, it is reported by Paul V. McNutt, director of the Office of Defense Health and Welfare Services, showed that the people had improved their knowledge and use of nutritive foods about 10 percent.

Certificates for Trucks Required

ODT orders all truck owners to obtain certificate for each vehicle by Nov. 15.

ALL food companies operating trucks will need Certificates of War Necessity for each of their vehicles by November 15. This is required under a general order (ODT 21) issued by the Office of Defense Transportation.

Without these certificates, no operator will be able to obtain gasoline, tires or parts, and the certificates will govern the maximum mileage that may be operated or the minimum load that may be carried, or both.

It is the purpose of the ODT in issuing the Certificates of War Necessity, to confine trucking operations to those which are necessary to the war effort or to the essential domestic economy, and it is further intended by ODT that operations be conducted so as to obtain maximum utilization of the equipment involved and also that the operators conserve and competently utilize rubber and other critical materials.

The ODT order further provides that any vehicle for which a certificate has been issued may be caused by the ODT "to be operated in such manner, for such purpose and between such points as the Office of Defense Transportation shall from time to time direct." Authority is also provided to cause any vehicle affected by the order to be leased or rented.

Applications for Certificates of War Necessity must be made on forms to be supplied by the ODT and must be submitted to the field office.

Bottlers Will Collect Cans

Enlisted by WPB to speed tin salvage. Will get No. 10 cans for manufacture of crowns

THE BEVERAGE industry, with its 35,000 trucks and million and a half retail outlets, has been enlisted by the War Production Board in the tin scrap campaign.

In the 140 metropolitan areas where can collection campaigns are under way, bottlers may, with the approval of local salvage committees and the WPB, collect No. 10 or larger cans from hotels, restaurants, institutions and the like. They will clean and prepare the cans, stripping the ends and seam and sending these parts to the city's collection point or to a detinning plant. The bodies of the cans will be shipped to crown manufacturers for stamping out crown caps. The crown manufacturer, in turn, will ship the skeletons of the cans after the caps are stamped out to the nearest detinning plant. They will retain, by this method, approximately one-third of the can by weight for use in bottling and deliver the remainder for salvage.

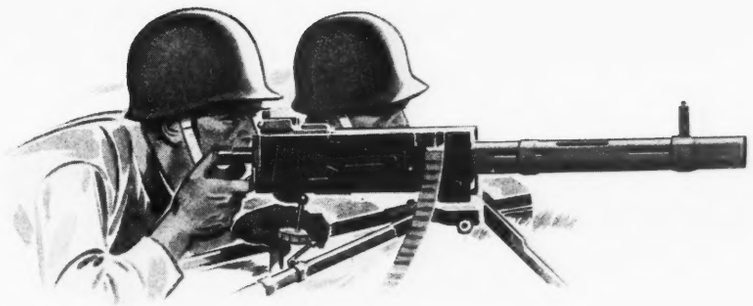
In all areas where no collection campaign exists, the bottlers will be asked by local salvage committees to conduct an educational campaign to enlist housewives to prepare cans and deliver them to convenient neighborhood stores. Bottlers in these areas will pick up cans of all sizes in the course of their regular deliveries, retaining the bodies of No. 10 cans for crown caps and delivering all the others to the nearest detinning plant.

This arrangement, it is believed, will enable bottlers to obtain the bulk of their crown cap needs from scrap which is not now being utilized, and will, at the same time, add greatly to the collection of tin cans.

Full utilization of current and projected detinning capacity will provide some 5,000 to 6,000 tons of tin annually and half a million tons of steel scrap.

Round Strapping Preferred

BY USING round wire strapping on nailed wooden boxes instead of flat steel strapping, the Quartermaster depots are saving between 45 and 50 percent of the steel required and cutting costs 25 to 30 percent, according to the War Department. It has been ordered that contracting officers direct the use of round wire strapping on all outstanding contracts prescribing nailed wood boxes where metal strapping is now required by specification.



Our FIRST and SECOND fronts

We at the Package Machinery Company also have two fronts to consider . . . First and foremost, is the speedy delivery of equipment to our armed forces. On this we are working day and night. The second is service to the package goods industry which is such an important factor in our economic structure.

Here's how we can help you:

1. If you need a wrapping machine for goods required by the armed forces, we can build you a new one.
2. We may *save you time* by locating a manufacturer who can sell or lease you a used machine of our make that will meet your needs. We have done this for numerous companies.
3. If you have to wrap a new product or change your wrapping materials, we'll help you adapt your machines to such new requirements.
4. Our service men will assist you in obtaining greater efficiency and longer wear out of your machines.
5. And our Engineering and Designing Department will be glad to start NOW on any new development you may have in mind, looking to the day when we can again supply industrial machines.

Write or phone our nearest office

PACKAGE MACHINERY COMPANY
Springfield, Massachusetts

NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO

Mexico: Agencia Comercial Anahuac, Apartado 2303, Mexico, D.F.
Argentina: David H. Orton, Maipu 231, Buenos Aires
England: Baker Perkins, Ltd., Peterborough
Australia: Baker Perkins, Pty., Ltd., Melbourne

Some of the many well known products that are wrapped on our machines

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

Is your Business carrying a fever?

Check the temperature at which your place operates with those on this chart. See what can be done with proper refrigeration. Perhaps your business should be carrying a lower temperature.

°F
80 Summer air conditioning
75 Cooled swimming pools
70 Winter air conditioning
65 Chocolate dipping rooms
60 Banana ripening rooms
55 Cold water for process work
50 Cold drinking water
45 Chilled water for air condit.
40 Storage of cheese, nuts, etc.
36 Short term food storage
35 Water for carbonation, etc.
32 Beef chill rooms
30 Long term apple storage
28 Ice storages
25 Oleomargine, skins, etc.
20 Chilled brine for processing
15 Brine for freezing ice
10 Frozen fish
5 Frozen meats
0 Locker rooms
-10 Freezers for raw cream
-15 Freezers in locker plants
-20 Commer'l quick-freezers
-25 Condensing gasoline
-30 Hardening ice cream
-40 Testing guns & radios
-50 Blizzard freezers
-70 Testing tanks
-80 Air for liquefying
-100 Research work
-110 Dry ice temp.

Ethylene liquefies -155
Natural gas liquefies -255
Oxygen liquefies -298
Liquid air temp. -315
Liquid Nitrogen -321
Liquid Neon -411
Liquid Hydrogen -423
Liquid Helium -452
Lowest temp. reached -459.4
Absolute Zero -459.6

TRADE FRICK MARK
Refrigeration

Is the answer to your needs for dependable cooling service. Write

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA. U.S.A.

War Production Board Orders

Salmon—To satisfy government requirements for canned salmon, WPB has refrozen stocks in the hands of canners until further notice, in Supplementary Order M-86-c issued Sept. 9. Under the preliminary order, canners were required to set aside and hold their entire stock of salmon, sardines, Atlantic sea herring and mackerel for the government for a period of 60 days after reporting to WPB that the fish had been packed. The 60-day period has expired in the case of part of the salmon pack, and the new order prevents disposal of salmon in such cases as well as freezing any salmon which may have been released for civilian consumption under M-86-b, if it is still in the canner's possession.

Dried Beans—Amendment No. 2 to Order M-119, issued Aug. 20, prohibits the use of a rubber-scaled closure for all forms of dried beans, in addition to the food products already listed. Packers may use existing inventories of closures designed for dried bean jars.

Silica Gel—On Oct. 1, Preference Order M-219 placed silical gel under complete allocation and use control. Silica gel, a dehydrated silicic acid, used principally as a drying agent to remove moisture and prevent corrosion in shipment and storage, is in heavy demand by the Army and Navy. To guarantee that all available silica gel is used for most essential military purposes, the order provides that no person may deliver or accept the product except by specific authorization of WPB.

Coffee—A further reduction in the amount of coffee available to American consumers was made on Sept. 1 in Amendment No. 1 to Supplementary Order M-135-c, which reduces civilian consumption from the present 125,000,000 lb. to 110,000,000 lb. a month. The reduction, necessary because of the shipping situation, sets the base quota at 65 percent of the average monthly amount of coffee a roaster delivered or a wholesale receiver accepted during the corresponding quarter of 1941.

Caffeine, Theobromine—Producers of beverages using caffeine (such as "cola" drinks) are affected by Conservation Order M-222, issued Sept. 5, putting caffeine and theobromine under complete allocation control. Both caffeine and theobromine, made from the now-critical supplies of cocoa beans, coffee, coffee scrapings, tea waste and maté, are important medicinal drugs and must be conserved for this purpose. The order, which went into effect Oct. 1, restricts the manufacture of caffeine through methylation of theobromine.

Sheep Intestines—Large meat packers have been instructed by WPB to hold deliveries of sheep intestines until all purchase orders for the manufacturing of surgical sutures are filled. Order M-220, issued Sept. 8, requires those who purchase sheep intestines for surgical gut purposes to make a certification to that effect to the packer. The balance of the product not used for surgical sutures is usually made into sausage casing.

Wines, Jellies and Preserves—Two new schedules to Limitation Order L-103, effective Sept. 12, add wines, jellies and preserves to the list of products that must be packed in standardized bottles. Containers manufactured before Sept. 12, or those made prior to Jan. 1, 1943, from a mold existing on the date of issuance of the schedule may be used without restriction, if they have capacities identical with the standard container. The simplification schedule lists bottles of eight specific capacities for bottling wine after Oct. 1, and five standard size bottles for jams, jellies, preserves and fruit butters.

Tinplate, Terneplate Cans—A further breakdown of tinplate and terneplate quotas was offered in Interpretation 1 to Order M-81 as amended June 27, 1942, issued Sept. 8. The Interpretation clarifies part of the original Order in respect to "seasonal base periods" in that a canner packing a product for which a seasonal base period is specified, may, until further order, use during the 1942–1943 packing season, the tinplate quota based on the 1941–1942 pack. The quota for the 1942–1943 packing season is separate from and in addition to the quota used during the 1941–1942 packing season.

Coconut, Babassu and Palm Kernel Oils—An order affecting importers and processors of coconut, babassu and palm kernel oils was issued on Sept. 16 by WPB. Supplementary Order M-60-a requires all persons who had an inventory of 240,000 lb. of these oils on Sept. 16 to set aside and hold intact 25 percent of that inventory for government purposes. Importers of coconut, babassu or palm kernel oil were ordered to set aside 25 percent of their imports.

Ripe Olives—Latest product to be added to the list of foods that may be packed in tin cans are ripe olives, which got official approval on Sept. 14 on the recommendation of the Food Requirements Committee. Amendment No. 3 to Order M-81 permits the use of No. 2½ cans or larger for the packing during the 1942–1943 season of 25 percent of the 1940–1941 pack. Not more than half of the permitted pack may be in cans smaller than No. 10.

Green Tea—Supplies of green tea, fast disappearing from the grocer's shelves, have been frozen by WPB in Order 1852 issued Sept. 16. No longer obtainable by the public, all green tea held by importers, packers, wholesalers and jobbers not already packed in ¼-lb. or smaller packages, is now reserved for government use. The inventory a tea packer may have on hand at any time is restricted to a six-month supply and that of an importer to a two-month supply.

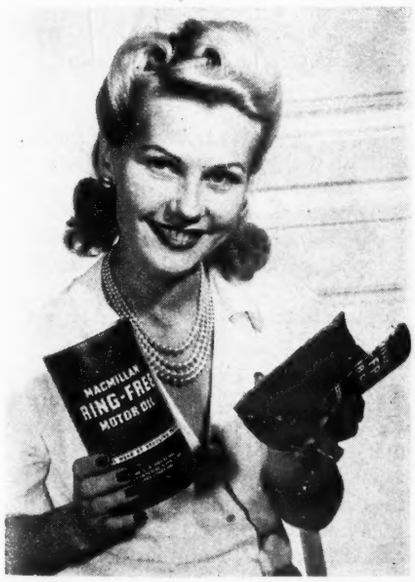
Molasses—All restrictions on the use of molasses in United States possessions outside continental United States were removed in Amendment No. 3 to Order M-54, issued Sept. 1. This permits use of molasses in Puerto Rico and the Virgin Islands.

Government to Promote Soya, Peanut Products

CONSUMPTION of greater quantities of soya and peanut products is to be promoted by the government to increase the supply of high-protein foods. Briefly outlined by Donald S. Payne of AMA at the meeting of American Soybean Association at Lafayette, Ind., in mid-September, the program involves further research into the nutritive qualities and use of soybean products, establishment of standards and specifications, and the formation of an inter-industry committee. AMA's food stamp program will be used in consumer acceptance studies, and educational programs by the government will help to put the new products across.

Demand for Dehydrated Meat Skyrockets

AGRICULTURAL MARKETING ADMINISTRATION'S recent 80,000-lb. purchase of dehydrated beef for Lease-Lend and military use marked the beginning of huge meat dehydration program. By the end of October the program is expected to increase capacity to 60,000,000 lb. annually. Dehydrated pork will be purchased in quantity this fall.



NEW "FARM GROWN" CAN

A new all-fiber plastic-lined container made from agricultural products and said to have possible use as a container for certain foods, including vegetable and animal oils, has been developed after five years' research by Albert A. Robbins, consulting chemist retained by Macmillan Research and Development Laboratories. Now being used for motor oil, it is said that every million of the containers made will consume 17 tons of agricultural products, including 12½ tons of corn. The new can is reported to be less expensive and lighter than a tin can.

Here's how to handle your plant hygiene at war-time speed!

If you are working added shifts and have a vastly increased number of workers, many of them women, your plant hygiene hazards are multiplied. The greater responsibilities you now have in protecting health and preventing infection make it worth while to investigate the possibilities of putting sanitation on a "mass production" efficiency basis.

It Can Be Done!

This FREE Oakite booklet tells how!

Instead of having to use two or three single-purpose materials in several operations to DEODORIZE, CLEAN and DISINFECT . . . you can do all THREE essential sanitation jobs at war-time speed in ONE single, low-cost operation by using Oakite Deodorant No. 1. The booklet gives full information on uses in washrooms, rest rooms, toilets, shower stalls, locker rooms.

OAKITE DEODORANT No. 1 GIVES YOU 6 MAJOR ADVANTAGES

1. Works best in cold water just as it comes from tap.
2. Costs only a few pennies a gallon to make up.
3. Odorless itself . . . yet it destroys odors. Does not mask one odor with another.
4. Safely, quickly cleans all kinds of surfaces.
5. Disinfects satisfactorily to protect against ordinary contamination.
6. Easy to use, saves time, sets new standards in sanitary control.

WRITE FOR YOUR FREE COPY TODAY

OAKITE PRODUCTS INC., 26G THAMES STREET, NEW YORK

Representatives in All Principal Cities of the United States and Canada

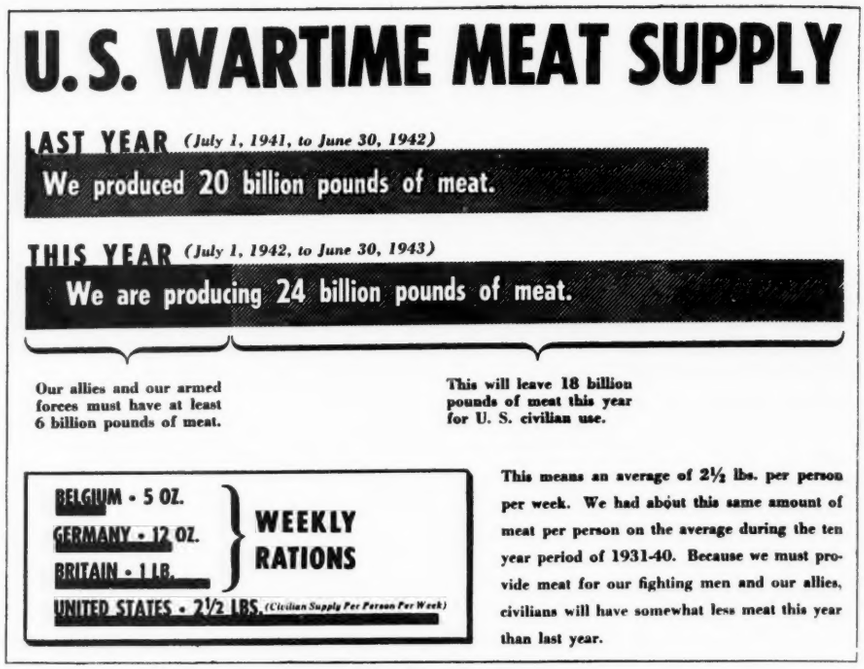
OPA Puts Restriction On Meat Grading

IN LINE with its newly acquired authority to develop standards for products subject to price ceilings, OPA has tightened the restrictions on the grading of beef and veal. Beef and veal carcasses and cuts sold as "choice" quality must be so graded and marked under the supervision of official Department of Agricultural graders. The order became effective September 18.

Packers Licensed To Enforce Prices

PACKERS and wholesalers of meat were ordered on September 8 to submit to licensing control by the OPA. The order automatically put the meat industry under licenses and provided that the license of any company violating price regulations would be suspended, removing the right to sell any meat or meat product subject to price regulation. At present the regulations apply to dressed hogs, beef, veal and lamb carcasses and virtually all wholesale and retail cuts except mutton.

The OPA also reported a drive in 18 cities against violators of price ceilings on beef and veal. More than 100 companies, including the "big four," are included in the list of those against which suits have been or will be filed by the government.


U.S. WARTIME MEAT SUPPLY
LAST YEAR (July 1, 1941, to June 30, 1942)
We produced 20 billion pounds of meat.
THIS YEAR (July 1, 1942, to June 30, 1943)
We are producing 24 billion pounds of meat.
Our allies and our armed forces must have at least 6 billion pounds of meat.
This will leave 18 billion pounds of meat this year for U. S. civilian use.
BELGIUM - 5 OZ.
GERMANY - 12 OZ.
BRITAIN - 1 LB.
UNITED STATES - 2½ LBS. (Civilian Supply Per Person Per Week)
WEEKLY RATIONS
This means an average of 2½ lbs. per person per week. We had about this same amount of meat per person on the average during the ten year period of 1931-40. Because we must provide meat for our fighting men and our allies, civilians will have somewhat less meat this year than last year.

THE MEAT SITUATION

Prepared by the Office of War Information, this chart shows what the country's meat supply is and where it will go. Though production is high this year, there will be less for domestic consumption.

Meat Rationing Asked by FRC

Consumption would be limited to 2½ lb. per person per week. Packers' quotas also asked

TO INSURE adequate supplies of meat for military and Lease-Lend purposes and to help provide for equitable distribution of the meat supply available for domestic civilian consumption the Food Requirements Committee has developed a national meat conservation program.

The FRC has made these recommendations:

1. That the WPB put into effect a conservation order establishing quotas for sales of meats by packers to civilian markets.

2. That consumer rationing be put into effect, limiting meat consumption to about 2½ lb. per person per week, which is equal to normal consumption but less than that for 1941.

3. That civilians voluntarily conserve the so-called red meats—beef, veal, pork, lamb and mutton—by substituting cheese, poultry, fish and beans for part of their meat requirements.

GMA To Hold War Session

TO AID in solving wartime problems of the food industries, an extraordinary session on these problems will be held by Grocery Manufacturers of America, in New York, November 18-20. It is

NOW—MOISTURE TESTS IN ONE MINUTE

On Dehydrated Vegetables, Meat, Eggs, and other products

The STEINLITE Electric Moisture Tester

Guaranteed Accurate

Easy to Operate

SPEED UP YOUR PRODUCTION AND SAVE MONEY

By means of the radio frequency impedance principle, the Steinlite makes a complete moisture test in ONE MINUTE. The sample is not heated, ground or damaged. It can be used to make tests on dehydrated vegetables, meat, eggs and the majority of ground or powdered products.

The Steinlite will give an immediate check on products in the course of manufacture and processing. It has a moisture range of 1 to 16% and is accurate to plus or minus .2 of 1%. Has proven its worth in the grain industry where over two thousand are in use. You cannot afford to overlook the possibilities of the Steinlite in your plant. See it demonstrated at the meeting in Rochester, N. Y., October 19-31. Write for information about our FREE TRIAL OFFER.

SEEDBURO EQUIPMENT CO.

634 Brooks Bldg. Chicago, Ill.

felt that a free interchange of information among food companies is necessary to quick solution of problems such as those of finding containers, of meeting price ceilings, and of getting food delivered to the Army, Navy, Lease-Lend and civilians.

ABA Calls War Conference

AMERICAN BAKERS ASSOCIATION will hold a two-day baking industry war conference in Chicago on October 20-21. This conference will be held in place of the usual annual convention, which has been canceled. Proper representation will be sought from every section and branch of the industry, and it is the purpose of the conference to inform these representatives as to necessary war regulations and instruct them on how to give this information to their section and branch of the industry.

Dairy Meetings Canceled

As a transportation conservation measure, dairy trade association executives have canceled the annual meeting scheduled for October 18-24, at Memphis, Tenn. The associations involved are International Association of Milk Dealers, International Association of Ice Cream Manufacturers, Milk Industry Foundation, Ice Cream Merchandising Institute, National Dairy Council, Certified Milk Producers Association of America, and milk and ice cream State Association Secretaries. The Dairy Industry Supplies Association previously discontinued the machinery exposition.

SCHEDULE OF EVENTS

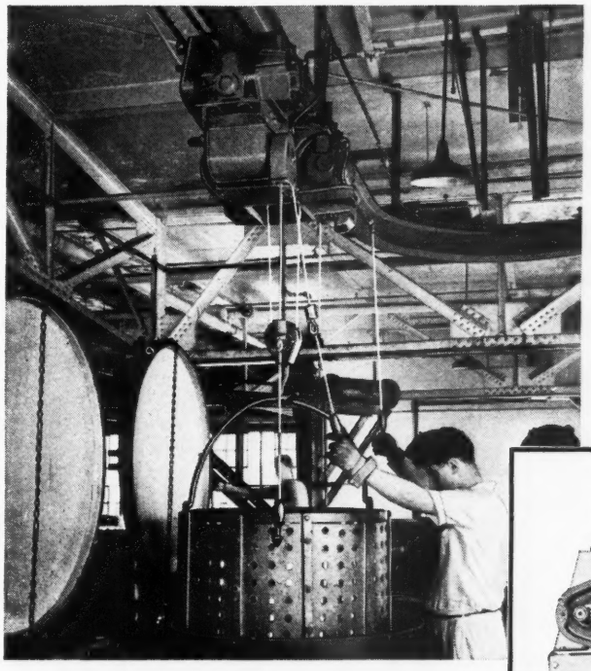
OCTOBER

2-6—American Meat Institute, 37th annual meeting, Drake Hotel, Chicago
5-6—Boston Conference on Distribution, 14th conference, Hotel Statler, Boston, Mass.
8-9—American Oil Chemists Society, annual meeting, Chicago, Ill.
14-15—National Association of Retail Ice Cream Manufacturers, Inc., Hotel Morrison, Chicago, Ill.
20-21—American Bakers Association, baking industry war conference, Hotel Sherman, Chicago, Ill.
19-22—American Dietetic Association, 25th annual meeting, Hotel Statler, Detroit, Mich.
19-24—National Frosted Foods Week.
26-31—National Doughnut Week.
27-29—National Safety Council, 31st Safety Congress and Exposition, Sherman, La Salle and Morrison Hotels, Chicago, Ill.

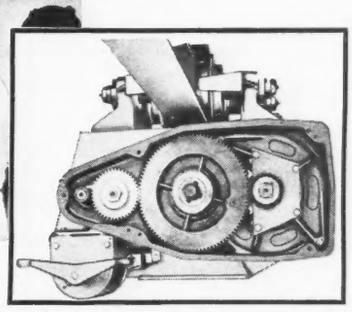
NOVEMBER

9-10—Bakery Sales Association, Drake Hotel, Chicago, Ill.
9-21—Siebel Institute of Technology, 69th annual course in Fancy Cake and Pastry Baking and Decorating, Chicago, Ill.
18-20—Grocery Manufacturers of America, Inc., Waldorf-Astoria Hotel, New York, N. Y.
24-29—Chicago Section, American Chemical Society, 2nd National Chemical Exposition, Hotel Sherman, Chicago, Ill.

Save TIME-Save LABOR! WITH R & M ELECTRIC HOISTS



Read what Crosse & Blackwell Co. says! "The 4 R & M Motor-Driven Hoists which we installed last year are helping us to do our part in aiding the country's war effort. They are both time and labor savers."



PERFECT ACCESSIBILITY!

Removal of front cover reveals ease with which all mechanism may be withdrawn, extreme simplicity, and precision engineering. Compactness reduces headroom, gives maximum strength, and increases lift.

JUST as R & M Electric Hoists are helping Crosse & Blackwell and other leading food producers save time and labor in filling wartime demands, they can help *you* by *speeding* your lifting and conveying operations.

They handle loads from any angle—with perfect balance, without sacrificing mechanical perfection. Their modern construction and advanced design assure trouble-free 24-hour service. And their many superior features guarantee the utmost utility, power and safety—with minimum headroom to conserve space!

Whether you require capacities of 1,000 or 15,000 lbs., there's an R & M Electric Hoist *tailor-made* for the job, and it can be equipped with special trolleys to fit any type of monorail. Where greater distances of movement and high-speed transportation are essential, investigate R & M's complete line of Motor-Driven Trolleys.

The following R & M Food Hoist distributors, or your nearest R & M sales and service office, will be glad to furnish complete details. Or write for factual Bulletins 6161A and 7171A.

SPECIAL R&M FOOD HOIST DISTRIBUTORS

Sprague-Sells Corp.....Hoopeston, Ill.
Berlin Chapman Co.....Berlin, Wis.
Chisholm-Ryder Co.....Niagara Falls
Dunkley Co.....Kalamazoo, Mich.
F. H. Langsenkamp Co.....Indianapolis
A. K. Robins & Co.....Baltimore

ROBBINS & MYERS • Inc.

HOIST & CRANE DIVISION • SPRINGFIELD, OHIO

MOTORS • FANS • MOYNO PUMPS • FOUNDED 1878

STOP THOSE SKIPPERS!

EVERY food plant operator knows what he has to contend with from pests. Take the skipper, for instance. A costly nuisance and a profit stealing pest. Contaminates foods, and if allowed to get out with the product is a source of complaint to say nothing of the loss of goodwill.

Control these pests by thorough fumigation with properly applied HCN gas. Call on your local Pest Control Operator. Talk over your pest problem with him and let him show you his plans for effective control. You will find that a well planned fumigation program carried out by expert and experienced Pest Control Operators may save you future expense and worry that will make it worth many times its original cost.

We have a book containing interesting information about pests and their control by fumigation. Just drop us a line on your letterhead and we will be glad to send you a copy. No obligation, of course.

DU PONT

REG. U. S. PAT. OFF.

E. I. DU PONT DE NEMOURS & CO.
INCORPORATED
ELECTROCHEMICALS DEPARTMENT
WILMINGTON • DELAWARE

CYANEGG
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AN ECONOMICAL SOURCE OF HCN FUMIGATING GAS

CAPITAL VIEWS

FOOD NEEDS—The first evidence that the Food Requirements Committee, headed by Secretary Wickard, was going to function usefully came in its recommendations of a meat program. That program demonstrated that the Committee was at last setting up supplies and requirements in parallel and undertaking to decide the policy for controlling shortages and encouraging new supply where possible. Whether this type of action is coming promptly and comprehensively enough to meet the recurring demand for an independent Food Administrator remains to be seen. Certainly WPB was not satisfied in early September with the Department of Agriculture management.

RATIONING—The demand for a complete meat rationing program, made by the Food Requirements Committee, is more a recognition of human fallibility than of good economic planning. Summaries of the meat situation clearly demonstrate that the American people even now can have on the average more meat than they have been accustomed to in recent years. Yet the Committee recognizes that complete rationing, clear through to the individual customer, is necessary to secure fair distribution. Without rationing, the greedy would get more than their share and the timid would go meat-hungry, appears to be the argument of FRC.

LARGER CONTAINERS – Washington continues to stress the necessity for packaging foods and beverages in larger containers. The shortage of closure material continues acute. Hence, it is going to be necessary for all divisions of the food business to adopt the big-unit sales campaigns which have led soft drink and beer makers to urge "buy a quart" where a one-portion unit had been previously promoted.

CALLED "LUXURIES"—Trucks hauling "beverages and other luxuries" will no longer get tires. This characterization of beverages as a luxury clearly points out the attitude which official Washington is going to take in many restrictions of the beer, carbonated beverage and other less vital divisions of the food business. It is going to be increasingly difficult for anything but the most essential foods to get much help from the government when shortage problems arise.

PATENT SUITS—Certain Federal officials, notably in the Department of Justice, are doing their best to restrict the effectiveness of patents on industrial commodities. In some cases this results in an effort by Federal officials to encourage Federal courts to rule patents invalid when the primary issue before the court is really an infringement suit or a suit to collect royalties. Apparently all companies seeking to protect their patent rights are thus confronted with a new hazard whenever they start court proceedings.

SPICE QUOTAS—The calculation of the quantity of spice which an industrial unit may buy, sell or package has caused some controversy. As a result, WPB has issued a rigid interpretation of its Order M-127 on this subject. This Order makes it clear that all quotas for future business must be calculated in units comparable with the units of business done in preceding years. In other words, the spice grinder or user may not casually jump back and forth from dry spice to spice extract or spice concentrate, in his estimates of requirements or quotas. This is to avoid unfair increases in the effective quantity of spice material obtained by one firm in comparison with others who are supposed to be subject to the same rationing rules.

EXTRA FREIGHT – The government found difficulty in purchasing canned meat and other meat products where original purchase offerings by the industry had specified one point of delivery and the government desired the actual delivery to be at another destination.

OPA has, therefore, recently ruled that delivered prices quoted for one destination may be increased when a delivery at a more distant or more costly point is asked for at the request of the Army. All of this emphasizes the importance for any food manufacturer of making his price quotations to the government clear as to point of delivery. Without such protection, the food man may suddenly find himself confronted with a demand for a much more costly bit of shipping than he counted on when he made his proposal. And when the government is the other party to business, adjustment of such quotations or bills is very difficult.

MORE ALCOHOL—The pressure for more alcohol to supply industrial war demands continues. It is notable, however, that about 60 percent of the production which is officially forecast for next year will be based on grain and not on molasses or synthetic supplies from petroleum. The farm spokesmen seem to forget this when they clamor in Congress for more plants to make alcohol or rubber or something from wheat and corn. Actually, there are several more food industry groups which can still be converted into alcohol manufacture, as and if further demand comes. They will not be so changed, however, unless there is real need because most of these plants are certainly going to produce high-cost alcohol. They would be important only if an urgent wartime demand could not otherwise be readily met.

Grade Standard Amended

U. S. standards for grades of canned orange juice which became effective on March 2, 1942, have been amended to provide an 18 percent free and suspended pulp tolerance for U. S. Grade A juice and a 20 percent free and suspended pulp tolerance for U. S. Grade C juice, provided such juice has been produced in the States of California or Arizona.

FAMOUS BAKER

Mrs. Margaret Rudkin, who five years ago carried six loaves of bread into a small-town general store and asked the proprietor to try to sell them for her. This last month she baked her ten-millionth loaf of Pepperdige Farm Bread to commemorate the fifth anniversary of her success as a baker of high-quality bread. She has proven that there is a market for a quality product which sells at a higher price.

Bail-Out Ration Developed

ENOUGH NOURISHMENT to satisfy a soldier's hunger for at least a day has been packed into a new "featherweight" package and is known as the "bail-out" ration. Intended specifically for Army fliers, it was developed by the Quartermaster Corps subsistence experts.

The complete ration, weighing about 8¼ oz., fits easily into the soldier's pocket. It contains a vitamized chocolate bar, a box of malted milk dextrose tablets, a carton of dextrose tablet, a tube of boullion powder and a stick of chewing gum. The package for the bail-out ration is the same as that for the K-ration, being specially treated heavy wax paper that is proof against grease, dirt, moisture and gas.

Big Home Pack Seen

NO LESS THAN 3,887,000,000 jars of food are expected to be put up by home canners this year, according to Secretary Wickard. This is half again as much home canned food as was packed in the peacetime years of 1935 and 1936. Mr. Wickard's figures are based on answers to a questionnaire sent to representative families by the Bureau of Home Economics.

NATIONAL NUTRITION PROGRAM

Wartime Responsibility of
MODERN REFRIGERATION

In thousands of retail stores, in food processing and storage plants, modern Refrigeration is daily performing its essential task of preserving the life-giving foods of the Nation. Today this is more important than ever before, for Victory depends upon continued health and vigor of workers and armed forces alike. Food waste is nothing short of sabotage of our war efforts.

VILTER REFRIGERATION
. . . Built for Vital Service . . .

Refrigeration Equipment today MUST come through with consistent efficiency, operating tirelessly, economically to do the greatest job it has ever been called upon to perform—and with the least possible attention and expense. VILTER Refrigeration in thousands of plants will prove capable of this demand. It has been designed and built for this LONG service.

There's a VILTER ENGINEER near by and willing to help you

If you need help in obtaining the utmost in efficiency from your present Refrigeration Equipment, call on a Vilter Engineer. He's busy enough with War work now, but preserving the Health of the Nation is important, too.

THE VILTER MFG. CO.

2115 South First Street Milwaukee, Wisconsin

Offices in Principal Cities

Superior Since 1867
VILTER
Refrigeration

Dry Soup Mix Sales Total $1,000,000

TODAY there are at least 50 brands of dry soup mixes containing dehydrated vegetables, with a total sales volume of over $1,000,000, and in the face of curtailed use of tin cans, this volume is likely to increase greatly as the available supply of ingredients permits. This compares with a total market value of all dehydrated vegetables for use in "vegetized" foods of $150,000 in 1937. These are figures reported at the convention of National Food Distributors Association in Chicago recently.

At present, the available production capacity is sufficient to meet only one-fifth of the announced need for the next 12 months, it was reported.

Mexicans and Japanese Harvest Sugar Beets

TO MEET an emergency in California's sugar beet harvest, a large number of Mexican farm workers have been recruited and imported to supplement local labor. The state's agricultural labor need calls for 150,000 local people in addition to the 1,500 Mexicans, who are admitted on temporary work permits for employment solely as agricultural workers, through a decision of the War Manpower Commission.

More than 1,500 Japanese evacuees from the Pacific Coast military area are already at work in the sugar beet fields of eastern Oregon, Idaho, Utah and Montana. Under the War Relocation Authority's revised procedure, wartime evacuees are now available for harvesting sugar beets and other vital crops in the intermountain region and the plains states.

New Pricing System To Be Announced Soon

THERE will be a more normal flow of food products through wholesale and retail distribution channels as a result of an alternative pricing system to be announced by OPA early in October. Under the new system, wholesalers and retailers will have the choice of using as their ceilings either their current maximums or an adjusted gross margin over the delivered costs of different groups of products. On a few selected commodities OPA is expected to establish fixed percentage margins with separate margins for different types of distributors at wholesale and retail. The plan is designed to ease the profit "squeeze."

GYPSY ROSE LEE STRIPS SKILLET

In addition to her better known talents, Gypsy Rose Lee is blessed with a fiery patriotism. And here you see the "strip" star lending her support to the fat salvage campaign. They say she cooks her own breakfast and saves the grease to "help shoot Hitler." It may be publicity, but in any case the lady effectively calls attention to the fat salvage program. Incidentally, the food industries can contribute much to this campaign. Meat packers, meat dealers and chain stores already have earned praise for their successful efforts in collecting waste fats in food stores.

Wheelco is still **FIRST . . .**

. . . in pioneering new applications for engineered electronics in temperature control.

The famous Wheelco "Electronic Principle" Control System provides faster, more accurate control than any other type of control and is constantly being applied to more control problems. In 1941, Wheelco incorporated the instantaneous control action of the "Electronic Principle" and extreme accuracy of temperature measurement into the UNIVERSAL Temperature Controllers, which are the first to provide such plus values as interchangeability of all component parts, interchangeability of scale ranges, ready accessibility of all parts for individual checking and many other features.

UNIVERSAL Controllers include Capacitrols, Potentio-trols, Limitrols and Resistance Therm-otrols.

Wheelco continues to pioneer new control applications for the "Electronic Principle."

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Wheelco Instruments Co.

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Wheelco—Originator of "Electronic Principle" Temperature Controls

Malt Research Solves Practical Problems

INVESTIGATIONS by the Malt Research Institute have settled a controversy which a few years ago showed indications of creating a chaotic condition in the barley production and utilization program of the United States. These investigations have shown that an excellent beer can be produced with malt from either the Oderbrucker or the Wisconsin Barbless barleys. And detailed study of the behavior of the two malts in the brewing process has shown that Wisconsin Barbless malt, with its characteristically somewhat slower enzymatic activity, is better adapted to controlled brewing procedures than the Oderbrucker malt. The resultant worts and beers from the two malts were different in composition. The taste tests indicated, however, little difference in preference between the two beers.

Plenty of Poultry

POULTRY of all kinds will be more plentiful this year than in previous years due to the increased production asked for by the Department of Agriculture. Poultry production increased 10 percent in 1941 over 1940 and 13 percent in 1942 over 1941.

Government Announces Fish Requirements

GOVERNMENT requirements of canned salmon, Maine sardines and pilchards from the 1942 packs were announced on September 16 by the Department of Agriculture. At least 60 percent of each canner's pack of salmon will be needed. And another 20 percent is to be retained by the canners until the government determines when it will be required. The government requirements of Maine sardines will amount to more than two-thirds of the estimated pack; of pilchards, 3,325,000 cases of an estimated pack of four to five million cases.

Key Men Need OK By Employer To Enlist

THE Army and Navy in a joint action in mid-September banned enlistment and commissioning of civilians in essential occupations. Under the new policy, civilians in executive or technical positions in industries to which the policy is applicable—including food processing and agriculture—must obtain written release from their employers before they will be accepted for voluntary enlistment or given a commission. Other employees in covered industries must obtain a release from their Selective Service boards, and employers may appeal these actions.

Bakers Reduce Truck Mileage 28 Percent

TREMENDOUS savings of vehicles, tires, gasoline and other facilities and materials, with minimum dislocation or impairment of essential service, have been effected in the baking industry under the ODT mileage reduction program. A survey by American Bakers Association showed that 651 bakeries reporting had reduced mileage by 27.75 percent in July, 1942, as compared with a year ago, in spite of the fact that the total volume of business handled was up 10.53 percent. During the same period there was a decrease of 7.29 percent in the number of route sales trucks used and a decline of 13.59 percent in the number of other than route sales trucks operated.

Two More Grade Standards

TENTATIVE Federal standards for grades of frozen red raspberries and frozen strawberries have been drafted by the Agricultural Marketing Administration, effective September 1, 1942. The tentative standards have been submitted to the industry for consideration.

FIBBER McGEE: "Our sponsor's mighty busy makin' wax-fortified paints."

MOLLY: "An' they're very good paints, too, McGee!"

JOHNSON'S *Wax-Fortified*

TRANSPORTATION ENAMEL

Made by the makers of Johnson's Wax

. . . steadily winning new users!

How can you conserve your trucks' finish, keep them attractive with a minimum of maintenance time? THAT'S a problem today. Here's a solution: Apply Johnson's Wax-Fortified Transportation Enamel.

This unique enamel, because it is impregnated with genuine wax, combines great beauty with a ruggedness that resists marring and scratches. Further, it provides a s-m-o-o-t-h surface, remarkably dust resistant, water repellent. Result: a well-protected surface easily and quickly cleaned.

Useful catalog, the "Why and What" of Wax-Fortified Paints, is yours for the asking.

S. C. JOHNSON & SON, INC.
INDUSTRIAL MAINTENANCE DIVISION
Dept. FI 102 • Racine, Wisconsin

Get in the Scrap-with your Scrap!

Tell How To Get Government Contracts

A GOVERNMENT contract for processed foods is obtained by letting the Quartermaster Depot know that an actual potential supply of a needed article is available, manufacturers were told by officers of the Chicago Quartermaster Depot at an industry relations meeting September 14. If the article is not needed, a record is made of the possible source of supply so that the company can be notified when a supply of the item is required. Financing of a government contract must be done through commercial bankers or by private or company funds.

Unused production facilities and capacities may be utilized if made known to the Quartermaster Procurement Division with an inventory of equipment available.

Plans Ice Cream Promotion

WAR-TIME developments having demonstrated that neither government agencies nor the public as a whole appreciate the real food value of ice cream and the importance of the ice cream industry to the farm economy of the nation, the International Association of Ice Cream Manufacturers has launched a three-year public-relations program. The story of ice cream will be expressed through newspaper publicity, material for radio publicity, folders, booklets, trade papers, agricultural journals, lectures, material for house organs, and other special publications.

Conducts Research on Vegetable Dehydration

EXPERIMENTAL work on dehydration of vegetables is being conducted at the New York State Agricultural Experiment Station in Geneva. Already several different varieties of cabbage, peas and beets have been tested, and sauerkraut, Swiss chard and sour cherries have been successfully processed. Special attention is being paid to the types of varieties best suited to dehydration, and marked differences have been observed between various varieties. Also under study are the degree of maturity best suited to dehydration and the effect of the process on vitamin content.

Develops Process For Butylene Glycol

AT the Northern Regional Research Laboratory, Peoria, Ill., a short and economical process has been developed for making butylene glycol, a relatively rare chemical with several important wartime uses. The method involves the fermentation of plentiful farm crops, such as corn and wheat. The laboratory is now producing the butylene glycol on a pilot-plant scale.

The Laboratory is also studying butylene glycol as a possible link in the production of butadiene for synthetic rubber. Three steps would be involved in the production of rubber from agricultural crops by this method—raw rubber to butylene glycol, butylene glycol to butadiene and butadiene to rubber.

Chemists at the Peoria laboratory have succeeded in producing excellent yields of pure butadiene from corn

NATURAL VITAMIN B COMPLEX

FOR THE FORTIFICATION OF FOOD

- LIQUID
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EXTRACTED FROM BREWERS' YEAST

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at a time like this

ALLIED CAN HELP YOU

When your groceries . . . milk, eggs, vegetables, soup or what-have-you become *dry goods* . . . consult Allied for the right bag.

Allied experience in bags for food products places us in the forefront of the new packaging parade in the development of moisture-proof, vapor-proof and light-proof bags and package liners.

Don't forget that dehydration is more than a process problem. It's a package problem too. And we are in a position to help . . . *at once!*

ALLIED PAPER BAG CORPORATION

BAYARD & CARROLL STREETS

BALTIMORE, MARYLAND

CONSTRUCTION NEWS

	Pending (thousands)	Awarded September (thousands)	Total Awarded 1942 (thousands)
Bakery	.....	.....	$50
Beverages	.....	.....	1,227
Canning and Preserving	$40	.....	465
Cold Storage Plants	85	$40	445
Confectionery	.....	.....	.....
Grain Mill Products	40	55	635
Ice Manufactured	.....	.....	180
Meats and Meat-Products	40	.....	183
Milk Products	278	105	1,427
Miscellaneous	778	190	3,989
	$1,261	$390	$8,601

made butylene glycol in the laboratory, but they have not as yet developed the process to pilot-plant scale.

Egg Production Going Up

THE PRODUCTION of eggs next year will hit an all-time high, if plans of the Department of Agriculture are carried out. This increase is necessary to supply the egg drying factories, the total capacity of which is expected to reach 350,000,000 lb. per year. Back in 1936, the capacity was only 6½ million pounds.

Oilseed Production Promises Big Yield

According to the most recent reports of the Bureau of Agricultural Economics, production of oilseeds in the United States in 1942 promises a greater yield of vegetable oils than had been expected. It is expected that cottonseed, soybeans, peanuts, etc., will be produced at a rate 44 percent over the total of any previous year, yielding more than 2,000,000,000 lb. more vegetable oil than last year.

However, in spite of this larger production it is expected that the fats and oils supply situation will remain tight. While imports of these products are greatly reduced, exports, under Lease-Lend, have greatly increased. And, certainly, domestic demand will not decrease.

Food Price Increase Pushes Up Indexes

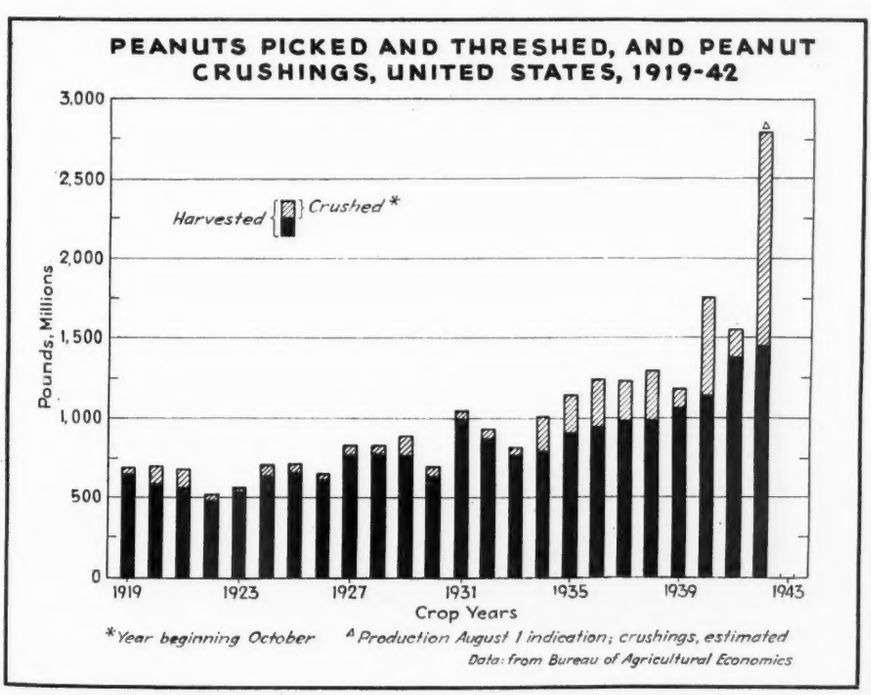
Commodity price indexes continued to rise during the four week period from August 15 to September 12. The *New York Journal of Commerce's* general index of commodity prices increased, for the period, from 103.5 to 104.2. This rise was largely due to increases in food prices, as indicated by an increase in the same publication's food price index from 105 to 106.6 for the period, and in its grain price index from 89.3 to 92.7 during the four weeks from August 15 to September 12.

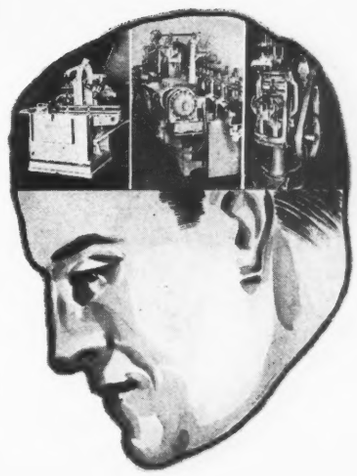
Among the individual spot commodity prices, certain increases were outstanding for the four week period. Wheat, No. 2 hard winter, Kansas City, at $1.10 on August 12, had jumped to $1.20¼ by September 10. Flour, at $6.05 on the earlier date, increased to a high of

Annual Per Capita Food Consumption in the United States Based on Figures of the Bureau of Agricultural Economics

(In Pounds)

Product	1909 to 1916	1917 to 1921	1922 to 1926	1927 to 1931	1932 to 1936	1937 to 1941
Eggs	37.2	35.7	39.5	40.9	35.5	37.7
Vegetables, Fresh	100.0	100.0	101.6	111.6	116.5	134.5
Vegetables, Canned	13.0	13.4	16.0	18.9	17.9	23.2
Fruits, Fresh	174.2	160.2	168.1	176.7	169.8	198.4
Fruits, Canned and Dried	8.4	13.8	15.2	18.7	18.0	23.4
Beans, Peas, Nuts	11.2	13.1	12.0	14.1	15.0	16.0
Coffee, Tea, Chocolate, Spices	13.2	16.6	16.7	17.4	18.4	21.2
Sugars and Sirups	91.0	95.8	115.9	114.4	107.9	113.7
Oils and Fats (except butter)	43.4	43.5	45.5	46.7	44.8	48.4
Butter	17.4	15.2	17.9	17.7	17.7	17.0
Dairy Products (except butter)	262.7	269.5	287.2	297.9	294.6	307.8
Wheat Flour	206.4	180.1	176.0	173.4	156.6	154.0
Other Cereal Products	77.1	55.6	51.3	49.4	43.3	42.1
Meat, Poultry and Fish	142.8	135.6	139.8	131.7	131.4	136.5
Potatoes	187.0	170.4	163.9	156.7	156.8	146.9
Total Consumption	1385	1318.5	1366.6	1386.1	1344.2	1420.8





WORLD EXPERTS

Are Still Thinking About Your Labeling Problems —Present and Future

Though the men and machines that build WORLD's finest Labelers are now concentrating on war production, we want you to know that WORLD's best engineering brains and experience are at all times back of you, whether you need their help in adapting your labeling procedure and equipment to current conditions or in planning to meet the opportunities that loom up for the future.

For advice and information of any character connected with label application, do not fail to get in touch with WORLD Labeler headquarters.

WORLD LABELERS

ECONOMIC MACHINERY CO.

WORCESTER, MASSACHUSETTS

$6.50. Lamb rose 1c. from 26c. to 27c. Eggs upped from 35c. to 36½c., while butter jumped also, going from 40½c. to 42½c. Most other food prices were steady under ceilings.

Crop Report Shows Even Greater Yields

Favorable as was the August crop report of the Department of Agriculture, the September report showed even better prospects. It was indicated that the total harvest this year would be at least 13 percent above the previous (1937) high record.

Among the increases noted over August were corn, now put at 3,016,000,000 bu., the largest crop since 1920; wheat at 982,000,000 bu., the largest since 1915; barley at 419,000,000 bu., the largest on record; and potatoes at 378,396,000 bu., a crop just over the ten-year average. Dry edible bean production is also expected to increase over August estimates, now being placed at 2,163,200,000 lb., while the dry pea yield has also been raised to 725,500,000 lb.

INDICATORS

Flour production in August, 1942, by mills accounting for 65 percent of U. S. production, as reported by *The Northwestern Miller*, was 6,009,562 bbl., compared to 5,926,581 bbl. in July, 1942, and to 5,638,887 bbl. in August, 1941.

Salmon pack in Alaska this year as of August 22, is estimated at 4,319,669 cases, compared to 6,284,292 cases for the same date last year. Total U. S. salmon packed is expected in 1942 to be close to 6,000,000 cases.

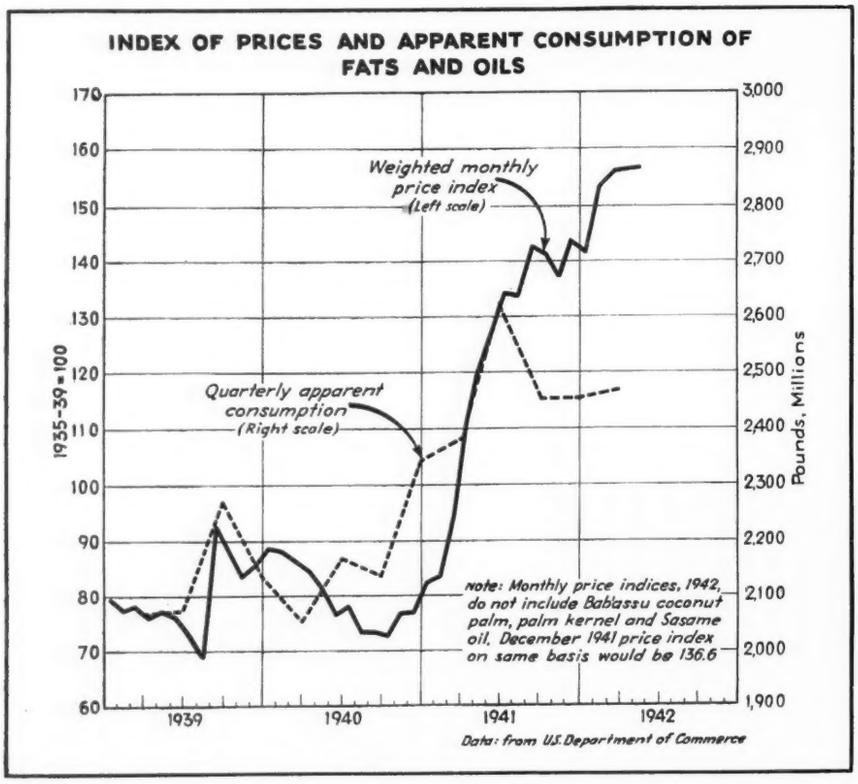
Sardines packed in California, up to September 3, 1942, totaled 418,428 cases, compared to 496,655 cases by the same date of last year.

Peas for freezing and canning totaled this year 427,460 tons, according to the latest (September 10) estimate. This compares to 1941 production of 345,460 tons, an increase of 24 percent.

Tomatoes for processing in 1942 were estimated by the Department of Agriculture on September 1 at 3,163,000 tons, up from 2,802,500 tons last year, an increase of 13 percent.

Sweet corn for processing this year, according to the September 1 report of the Department of Agriculture, will be 1,329,000 tons, compared to 1,125,000 tons in 1941, an increase of 18 percent.

Snap beans for processing in 1942 will be around 186,200 tons, according to the September 1 report of the Department of Agriculture. This is 41 percent above the 1941 production of 132,020 tons.


INDEX OF PRICES AND APPARENT CONSUMPTION OF FATS AND OILS
Weighted monthly price index (Left scale)
Quarterly apparent consumption (Right scale)
1935-39=100
Pounds, Millions
note: Monthly price indices, 1942, do not include Bablassu coconut palm, palm kernel and Sasame oil. December 1941 price index on same basis would be 136.6
1939
1940
1941
1942
Data: from U.S. Department of Commerce

Pimientos for processing in 1942 are expected to total 19,770 tons, an increase of 77 percent over the 1941 crop, according to the September 1 report of the U. S. Department of Agriculture.

Lima beans, green, for processing this year are estimated at 46,820 tons, up 23 percent above the 1941 production of 38,100 tons, according to the U. S. Department of Agriculture's September 1 report.

Cabbage for kraut in 1942 is expected to total 164,800 tons, according to the September 1 report of the Department of Agriculture. This compares to 211,000 tons in 1941 and to a 1931–1940 average of 152,500 tons.

Cranberry production this year is estimated at 756,400 bbl. by the Crop Reporting Board. This compares to an actual crop of 725,200 bbl. in 1942.

Milk, fluid, sales in July, 1942, as reported by Milk Industry Foundation, were 14.3 percent over sales in July of last year.

Butter, creamery, produced in July, 1942, was estimated by the Department of Agriculture at 188,665,000 lb., 3 percent lower than in July, 1941, but 8 percent over the July, 1931–1940, average. Production in first seven months of 1942 was 1,119,235,000 lb., 6.1 percent below 1942 production, but 5.4 percent over the 1931–1940 average.

Cheese, American, produced in July, 1942, was reported by the Department of Agriculture at 97,005,000 lb., 24.8 percent over production in July, 1941, and 45 percent above the July, 1931–1940, average. For the first seven months of 1942 production was 615,400,000 lb., 45.1 percent above a like period of 1941 and 110.7 percent over the 1931–1940 average.

Eggs, liquid, packed in July, 1942, totaled 48,248,000 lb., 25 percent above production in July, 1941.

Eggs, whole, dried, produced in July, 1942, totaled 21,969,365 lb., up 850 percent over the July, 1941, output.

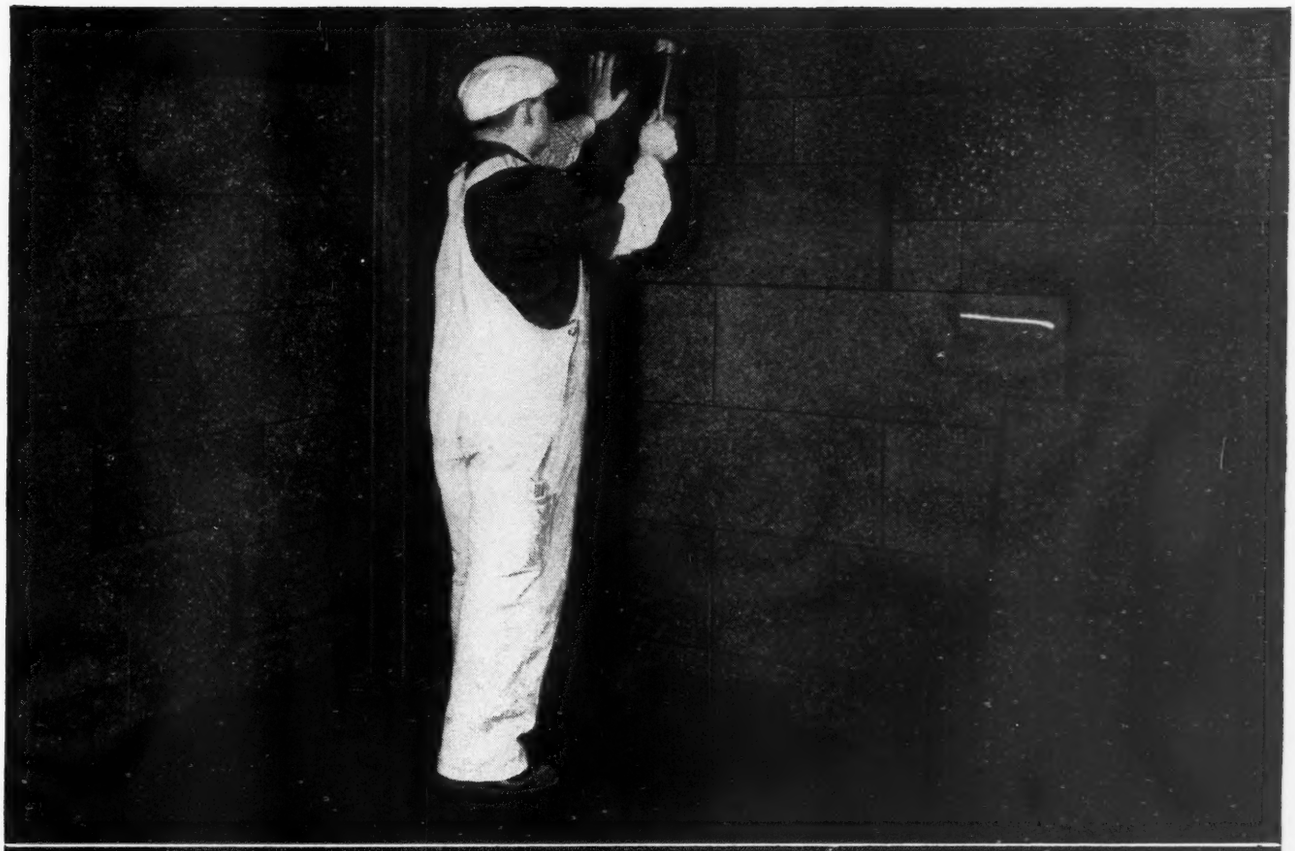
Oleomargarine sales in July, 1942, as indicated by sales of internal revenue stamps, were 23,779,239 lb., a decrease of 24.1 percent from July, 1941, sales.

Beer sales in July, 1942, were 6,814,000 bbl., a new monthly record and 546,000 bbl. greater than a year before.

Weekly wholesale food price index of Dun and Bradstreet was $3.81 on September 8, 1942, a peak for over 17 years and comparing to $3.76 one month earlier and to $3.34 a year before.

Business activity index of *Business Week* was 186.3 for the week ending September 12, 1941, compared to 185.1 a month before and to 161.2 a year earlier.

Cost of living index of National Industrial Conference Board was 98.1 at the end of August, compared to 97.8 a month earlier and to 89.4 a year before.



Good news!...prompt delivery on cork insulation for priority work

IF you're planning construction which rates a priority of A-10 or better and requires low temperature insulation, you'll be glad to know that Armstrong's Corkboard and Cork Covering are available for prompt delivery.

Large quantities of corkboard and cork covering have been furnished within the past year for essential war work including powder plants, oil refineries, ships, synthetic rubber plants, cold storage rooms for Army camps, refrigerated cabinets and truck bodies, wind tunnels, and sub-zero test rooms. Despite ocean shipping difficulties, ample supplies of cork have arrived regularly and the stock on hand remains at a good level.

Armstrong's Corkboard and Cork Covering are ideally suited to these essential jobs because they provide lasting and dependable protection. They form an efficient barrier to the passage of heat. They hold low temperatures under accurate control and with a minimum of refrigeration. Corkboard and Cork Covering are strong and rigid, yet light in weight, and stay in place.

TWO OTHER ARMSTRONG'S MATERIALS FOR LOW TEMPERATURE INSULATION

Two additional Armstrong's Insulations, Mineral Wool Board, and Foamglas are available for ordinary installations as well as those carrying priority ratings.

Armstrong's Foamglas—a brand-new form of glass made up of thousands of tiny airtight cells which provide an efficient heat barrier. Because Foamglas is vaporproof, it keeps its original insulating efficiency permanently. It is light in weight, has unusual compressive strength, is noncombustible, verminproof, and odorless. The block size is 12″ x 18″ in 2″, 3″, 4½″, and 6″ thicknesses.

Armstrong's Mineral Wool Board—a new noncritical material basically mineral wool with a waterproof binder. It is made in a strong board form, has a low thermal coefficient, good moisture-resistance and is free from objectionable odor and from any liability to rot, mold, or harbor vermin. Armstrong's Mineral Wool Board is made in one standard size, 12″ x 36″, and in thicknesses from 1″ to 4″. It is quickly and easily erected and will stay in place without settling or warping.

Whatever your insulation needs may be, one of these efficient materials should prove highly satisfactory. Get the facts about all three today and take advantage of the engineering help available at "Insulation Headquarters." Write now to Armstrong Cork Company, Building Materials Division, 916 Concord Street, Lancaster, Pennsylvania.

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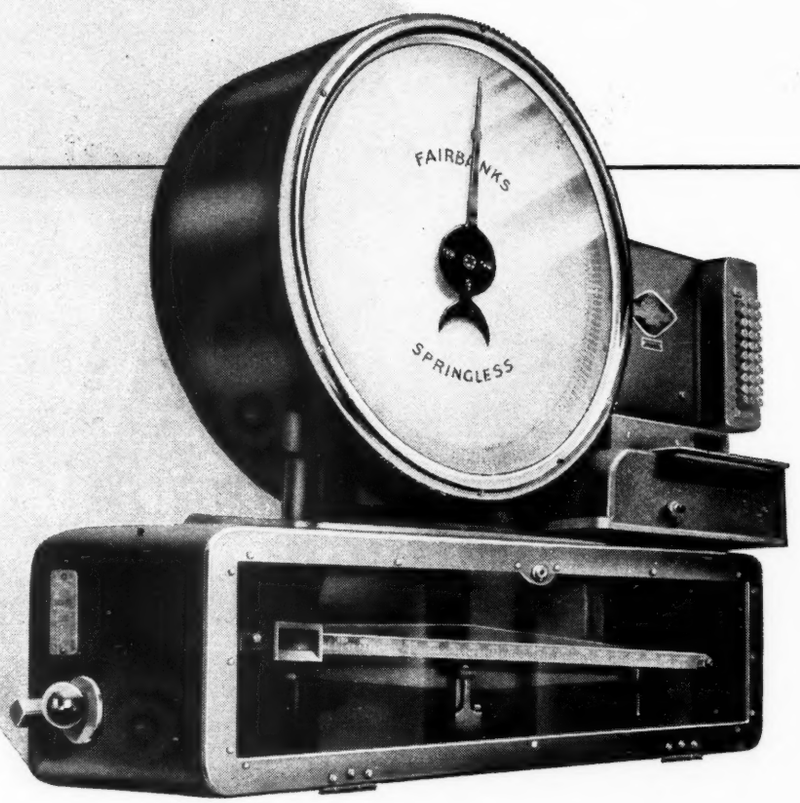
THESE SCALES HELP UPSET THE AXIS TIMETABLE!



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Use your priority to get Fairbanks weighing equipment that will not only save precious minutes now but also serve you best in years to come.

Fairbanks scale engineers are ready to help you plan for today with an eye for tomorrow. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago.

FAIRBANKS-MORSE

FAIRBANKS SCALES

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INDUSTRY

Anheuser-Busch has converted part of its brewery in St. Louis, the largest in the world, to the manufacture of glider parts on a sub-contract basis.

Bay City (Mich.) Canning Co., under Mr. Hinman, general manager, has been granted approval by the U. S. Department of Agriculture for AMS continuous factory inspection.

Birds Eye Frosted Foods, division of General Foods, has announced the acquisition of Southern Farms poultry dressing plant, Pocomoke City, Md. The plant will facilitate the preparing and quick freezing of poultry and may at a later date pack Maryland fruits and vegetables, although no expansion can be made under present conditions.

Borden Co. has begun operation of its new milk plant in Newberry, S. C. The new plant has a capacity of 150,000 lb. of milk daily.

Bowman Dairy Co., Chicago, Ill., has purchased the Harding Dairy which was formerly owned and operated by the John P. Harding Restaurants organization.

British Columbia Packers, Ltd., recently lost its big four-line cannery and equipment at Wadhams, on Rivers Inlet, B. C., in a fire of unknown origin.

Camp County Dehydration Co., Pittsburgh, Tex., will award contracts for construction of a potato yam dehydration plant costing $300,000 with equipment.

Central Ohio Milk Producers Cooperative Association is establishing a spray-drying plant that will use 150,000 lb. of skim milk daily. Located near Columbus, the plant will have a capacity of 750 lb. of milk powder an hour, all of which will go to Lease-Lend.

Doyle Packing Co., Inc., Long Branch, N. J., is establishing a new dehydration plant in that city, renovating and enlarging old buildings. President of the concern is A. E. Vaughn, and Seth Burrows is dehydration engineer.

Evangeline (La.) Pepper & Food Products Co. is building a new sweet potato, pepper and vegetable dehydration plant, costing more than $50,000.

Inglehart Brothers, Evansville, Ind., a subsidiary of General Foods, will lease a mill at an undisclosed location in Nebraska to process Icoti sorghum. The grain will be processed into flour in Nebraska, then shipped east for further processing into starch, tapioca and other products.

P. L. O. SMITH

Hecker Products Corp. has named P. L. O. Smith general manager of the flour and cereal division of the company. Formerly with Pillsbury, Mr. Smith joined Hecker Products as a bakery sales manager and was recently stationed in New York as general sales manager.

FRED P. SLIVON

Libby, McNeill & Libby, Chicago, has announced election of Fred P. Slivon as comptroller and secretary, succeeding Dwight E. Hillyer, deceased. Mr. Slivon has been with the company since 1929, serving as office manager, assistant secretary and assistant comptroller.

Hygrade Food Products Corp., New York, has purchased Major Brothers Packing Co., 45-year old firm of Mishawaka, Ind. Marvin B. Cone will continue as general manager.

Maine Food Processors, Winterport, Maine, has been organized with J. E. Totman, president, R. E. Fraser and J. E. Wight, vice-presidents, W. A. Fessler, treasurer, and R. L. Merritt, secretary. The plant will process dehydrated potatoes for Army use.

John Morrell & Co. has voted to offer six of the firm's railroad tank cars to the government to help the war effort. The tank cars, each with an 8,000-gal. capacity, which are suitable for carrying fuel oil or vegetable oil, have been used for carrying lard, greases, tallow and other products of the firm's packing plants.

Mt. Airy (N. C.) Canning Co. is being converted to production of dehydrated foods for army use. A huge order for dehydrated cabbage has already been placed with the firm.

Ripon (Wis.) Foods, Inc., will build a two-story addition to its plant, costing $50,000.

Sperry-Young-Kevan, Inc., Kansas City, Mo., brokers and jobbers, has announced a new division of the company, Food Products Corp., which will take over the firm's manufacturing business. George E. Young will continue as president of the parent organization; vice-president and general manager is George H. Rapaport.

United Fruit Co. has canceled all contracts with private banana planters on the Atlantic Coast of Costa Rica, presumably as a result of import restrictions and the loss of ships by submarines.

PERSONNEL

H. N. Brocklesby has resigned as a member of the scientific staff of the Fisheries Research Board of Canada to accept a position in the United States. He is well known for his investigations on the processing of fish liver oils and vitamin oils.

Harry A. Bullis, executive vice-president of General Mills, Inc., is now chairman of the flour milling industry division of the American Industries Salvage Committee.

Park Daugherty, for several years in charge of the "Flavor Sealed" department of George A. Hormel & Co., has been elected a vice-president of the firm.

L. O. Ehrlich, formerly vice-president in charge of production with Glaser-Crandell Co., has joined United Packers, Inc., Chicago, as production manager.

Paul Fetterman, George J. Sherwood, and Hulbert S. Murray have organized Pacific Frozen Foods at Seattle, with $25,000 capital.

Carl E. Gill, director of industrial relations and personnel for Walter Baker Co.,

CHRISTIE E. CUDDEBACK

Christie E. Cuddeback, vice-president of Sheffield Farms Co., has been elected president of Western Maryland Dairy, Inc., Baltimore, subsidiary of National Dairy Products Corp. He succeeds Thomas K. Carnes, who has been elected comptroller of National Dairy.

division of General Foods Corp., Boston, Mass., has been appointed director of industrial relations for Wanskuck Co., Providence, R. I., in connection with its Wanskuck, Steere and Geneva Mills. Mr. Gill was formerly U. S. commissioner for conciliation, Department of Labor, and industrial advisor to the labor division of WPB.

Howard A. Hensley, Shenandoah, Va., has organized the Shenandoah Flour Mills, Inc., of which he is secretary and treasurer, reopening mills which have been idle for five years.

Douglas McBean, former chief engineer, Beech-Nut Packing Co., Rochester, N. Y., is now in Washington with WPB to work on processing dehydrated vegetables.

E. Marshall Nuckols, prominent attorney, has been elected secretary of the Campbell Soup Co., Camden, N. J. He has been associated with the Washington D. C., law firm that National Canners Association retains as counsel.

Donald W. Reed has resigned as marketing specialist, Maine Agricultural Extension Service, to become superintendent of raw materials for H. C. Baxter & Brother, Brunswick, Maine.

J. Thomas Schneider, formerly counsel for the New York agency of the Reconstruction Finance Corp., has been appointed chief counsel and head of the legal department of Standard Brands, Inc.

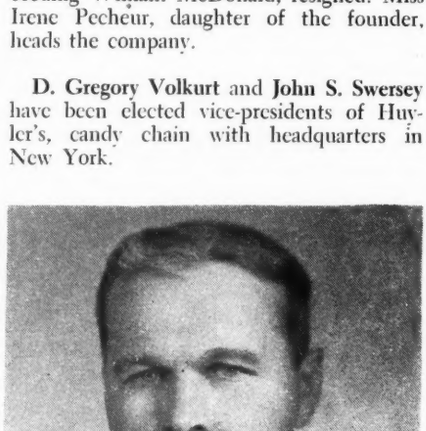
Ralph Schust, formerly assistant general manager and sales manager of the Saginaw, Mich., bakery of Loose-Wiles Biscuit Co., has been appointed general manager.

Belford L. Seabrook, general manager and chief engineer for Deerfield Packing Co., Bridgeton, N. J., has entered the Army Engineer Corps. John M. Seabrook will serve as general manager of the company for the duration.

Alden C. Smith, Shiocton, Wis., has been reelected president of National Kraut Packers' Association.

R. M. Thatcher has been named vice-president and general manager of Pecheur Lozenge Co., Inc., Brooklyn, N. Y., succeeding William McDonald, resigned. Miss Irene Pecheur, daughter of the founder, heads the company.

D. Gregory Volkurt and **John S. Swersey** have been elected vice-presidents of Huyler's, candy chain with headquarters in New York.



LAWRENCE S. MARTIN

Lawrence S. Martin, formerly a member of OPA's Food Division, has been appointed secretary of National Association of Frozen Food Packers, Washington, D. C., succeeding E. M. Burns.

James L. Winslow, vice-president and director of distribution, Rochelle (Ill.) Asparagus Co., will resign on Nov. 1. Mr. Winslow was coorganizer of the company with the late George E. Stocking.

DEATHS

Douglas Dickson Cook, 64, retired secretary and son of the founder of American Wine Co., recently, in St. Louis, Mo.

George P. Crane, 73, former assistant superintendent of American Sugar Refining Co., Aug. 30, in New Orleans, La.

Milton C. Drewa, 46, president and general manager of Congress Candy Co., Houston, Tex., was found slain in his automobile, recently, near Houston. No motive has yet been established for the murder.

Charles F. Freihofer, 82, founder of Freihofer Baking Co., Philadelphia, Sept. 14, in Fort Lauderdale, Fla. He also founded the Charles Freihofer Baking Co. in Troy, Albany and Schenectady, N. Y., and a bakery by that name in Indianapolis.

Daniel M. Houghland, 69, widely known midwest canning industrialist, director and vice-president of the Indiana Canners Association, and former president of Houghland Packing Co., recently, in Franklin, Ind.

Samuel Sorensen, 65, superintendent of New England Fish Co. canneries at Noyes Island and Chatham, Alaska, recently.

Paul L. Stanton, 52, former member of the board of directors of National Canners Association, and one of the country's pioneer citrus canners, Aug. 26, in Tampa, Fla. At the time of his death he was vice-president and general manager of Florida Fruit Canners, Inc., Frostproof, Fla.

Robert Gardner Wilson, 76, retired purchasing agent for Borden Co., Sept. 8, in Norwalk, Conn.

ASSOCIATED INDUSTRIES

Baker Ice Machine Co., Inc., Omaha, Neb., has announced the recent death of John M. Fernald in Washington, D. C.

Container Corp. has announced the appointment of Dr. Robert A. Diehm as technical director of the organization. Dr. Diehm was formerly associated with Rohm and Haas Co., Philadelphia, in a research capacity.

Continental Can Co. has elected Frank J. O'Brien as executive vice-president of the company, with headquarters in New York. He was formerly vice-president in charge of manufacture and general manager of production.

Jenkins Brothers, manufacturers of valves, has been awarded the Army-Navy "E" for excellence in production of war materials, in its Bridgeport, Conn., plant. Victor Chemical Works, Mt. Pleasant, Tenn.; Ohio Injector Co., Wadsworth, Ohio; and Handy and Harman's plant at Fairfield, Conn., were similarly honored.

Merck & Co., Inc., Rahway, N. J., has turned in 640,292 lb. of scrap iron, 5,199 lb. of scrap rubber, and substantial quantities of other strategic materials, in a salvage campaign conducted by employees.

Ransome Concrete Machinery Co., Dunellen, N. J., has simplified its corporate name to Ransome Machinery Co., continuing to manufacture the same products.

Foster D. Snell, Inc., Brooklyn, N. Y., has granted leave of absence to Dr. J. Mitchell Fain, chemical engineer, who is now with the Chemical Warfare Service.

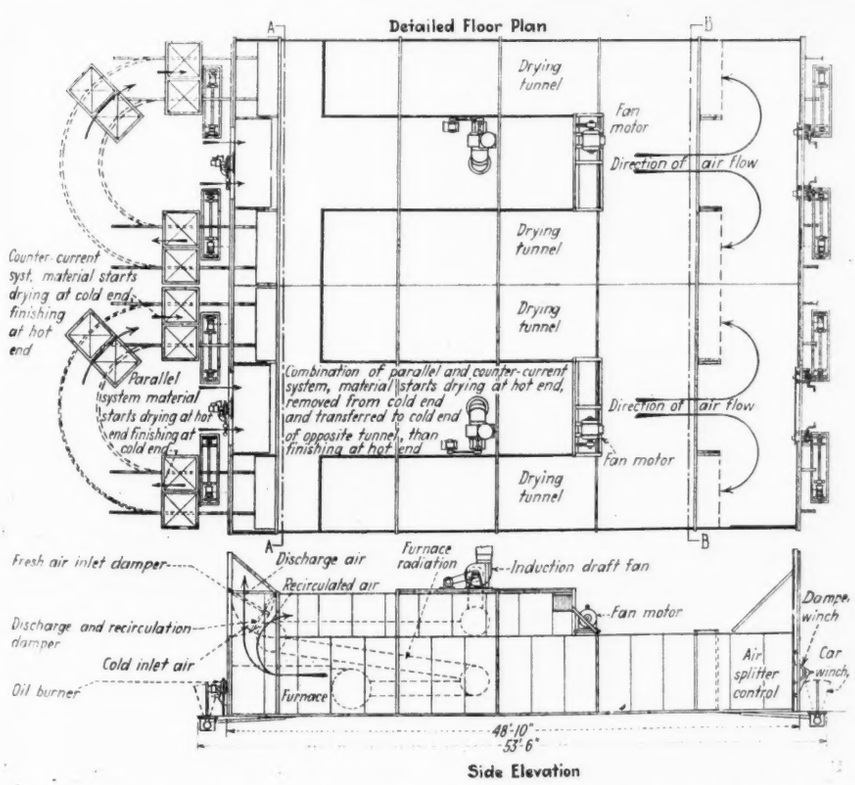
York Ice Machinery Corp. has created a new administrative division of Industrial Relations, with Joseph E. Moody as manager.

FOOD EQUIPMENT NEWS

Tunnel Dehydrater

E. H. Guthier & Co., 709 So. Main St., Santa Ana, Calif., have brought out their Model "V" vegetable dehydrater, a machine that permits the use of parallel flow dehydration, counter flow dehydration, or a combination of both in the same apparatus. The machine comprises four drying tunnels and two furnace sections, and occupies floor space 46 ft. 10 in. long, by 42 ft. 6 in. wide. The capacity per day in raw products, depending upon the vegetable being dehydrated is from 35 to 50 tons. Drying is accomplished on trucks 38 in. wide by 75 in. long, each accommodating two stacks of trays, 20 trays high. Each tunnel accommodates 12 trucks or a total of 480 trays per tunnel, or 1920 trays for the four tunnels for each individual charge. At 8 sq. ft. of net spreading surface per tray, a total of 15,360 sq. ft. of drying surface is available at each charge. Trucks are moved through the tunnels by means of power hauling devices installed at each end for use with either parallel or counter-current drying. This dehydrater can be equipped for heating with either natural gas or steam heated coils as desired. In case steam is employed, a 200 hp. boiler should be installed to provide the necessary heat. Total horsepower required for the two air circulating fans is 25 hp. each or 50 hp. total. And the car haulers when motorized require a 2 hp. motor each.

Details of the construction of this dehydrater are evident from the plan and elevation sketches shown herewith.


Detailed Floor Plan
Drying tunnel
Fan motor
Direction of air flow
Drying tunnel
Drying tunnel
Counter-current syst. material starts drying at cold end, finishing at hot end
Parallel system material starts drying at hot end finishing at cold end
Combination of parallel and counter-current system, material starts drying at hot end, removed from cold end and transferred to cold end of opposite tunnel, than finishing at hot end
Direction of air flow
Fan motor
Drying tunnel
Fresh air inlet damper
Discharge air
Furnace radiation
Induction draft fan
Recirculated air
Fan motor
Damper winch
Discharge and recirculation damper
Cold inlet air
Air splitter control
Car winch
Oil burner
Furnace
48'-10"
53'-6"
Side Elevation

Plant and elevation of Model "V" vegetable dehydrater made by E. H. Guthier & Co., Santa Ana, Calif.

New Fumigation Method

Dow Chemical Co., Midland, Mich., has developed a new plastic-coated tarpaulin for use in the fumigation of insect infested food materials that are not located conveniently to adequate fumigating facilities. The new tarpaulin is made of a light duck fabric and is heavily coated on one side with Ethocel, a plastic material made by Dow, and impervious to methyl bromide fumigating gas. On the reverse side of the tarpaulin the coating is lighter. This treatment is said to make the tarpaulin both highly flexible and strong. It is claimed to be impervious to ultra violet light, not to crack or become brittle with age, and to be light in weight. A tarpaulin 30x30 ft. in size weighs 56 lb., about half the weight of the same size tarpaulin made in rubber.

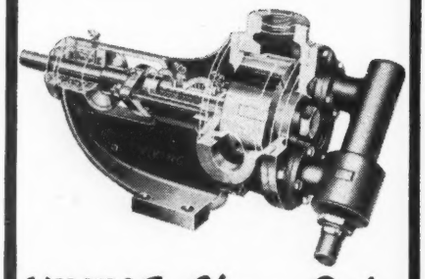
Fumigation method employing a tarpaulin of duck coated with Ethocel.

In fumigating by this method, the goods to be fumigated—from 15 to 18 tons of grain, flour or similar material can be fumigated at once under a 30x30 ft. tarpaulin—are placed in a pile as is shown in the accompanying illustration and then covered with the tarpaulin.

Milk Can Conditioner

Oakite Products, Inc., 26G Thames St., New York, has brought out a material called Oakite Compound No. 84, for conditioning or brightening milk or cream cans, and at the same time removing all traces of lime scale from the can washing machine. The manufacturers recommend that as a regular maintenance procedure the material, which is of an acid nature, be used for two successive days in the can washing machine, either once or twice a month, depending upon the hardness of the water in the locality where used. When used in this way, it is said to remove milkstone, hard water scale and light rust film from both the inside and

The ANSWER TO MANY A TOUGH PUMPING PROBLEM



VIKING Heavy-Duty ROTARY PUMP

If you're up against a special problem, such as the pumping of viscous materials, unbalanced pressure conditions, varying loads, or some other unusual application, the heavy duty Viking Rotary Pump probably can do the job.

Available in capacities from 10 to 300 GPM. Larger sizes up to 1050 GPM for heavy duty service. Furnished in many mounting styles, including gear drive, V-belt drive, direct connected and double back-geared.

Bulletin 2500-40 illustrates and describes the many types and sizes of heavy duty Viking Rotary Pumps. Write for your copy today. It's FREE.

★

UNCLE SAM'S ORDERS

When ordering pumps or parts, it is necessary to give us your priority rating and allocation symbol. Be sure to obtain the highest rating possible. Priority regulations are changed frequently. Check up and see if changes made improve your rating. Thank you.

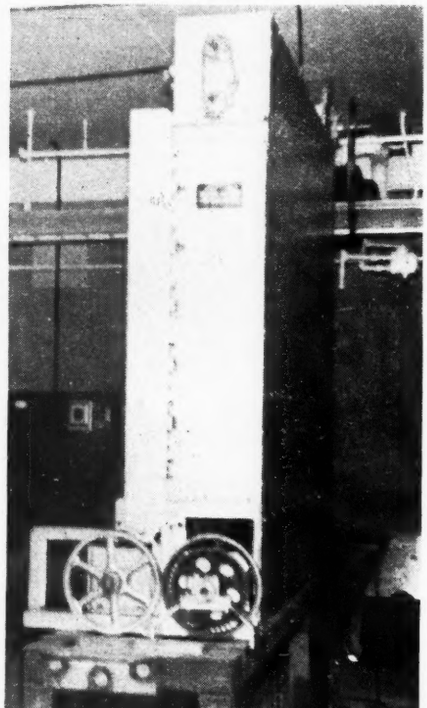
★

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

outside of the cans, and to leave them with a considerably brightened appearance. After the cans have been properly conditioned, the jets and sprays of the can washing machine are allowed to run continuously so that the solution penetrates every surface that might be coated with lime scale. After this, both the cans and the can washing machine are neutralized with the alkali can washing material that is regularly used.

Electrostatic Separation

Ritter Products Corp., Ritter Park, Rochester, N. Y., is making a device for separating waste materials from valuable food products by electrostatic means. Briefly, this device consists of a hopper



Electrostatic device for separating materials.

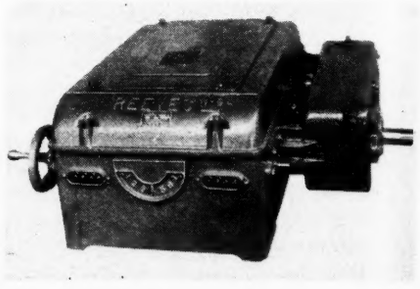
from which the material is spread by a revolving roll into an electrostatic field created between the roll and a charged revolving electrode. Different materials are repelled to different degrees by passing through this field and are thus caused to be deflected in their fall from a vertical line. By varying the strength of the field, a separation can thus be effected.

Tire Mileage Gage

Standard Oil Co. of Indiana, 910 So. Michigan Ave., Chicago, has brought out a tire mileage gage for estimating the average mileage remaining in a tire. This is done by measuring the depth of the anti-skid tread. The gage makes various estimates of tire mileage ranging from 6,720 miles to 53,200 miles for a tire which is driven up to 40 miles per hour, receives proper care and is not recapped, retreaded or regrooved.

Variable Speed Transmission

Reeves Pulley Co., Columbus, Ind., is making a special design of the Reeves variable speed transmission, of inclosed type, equipped with a built-in chain

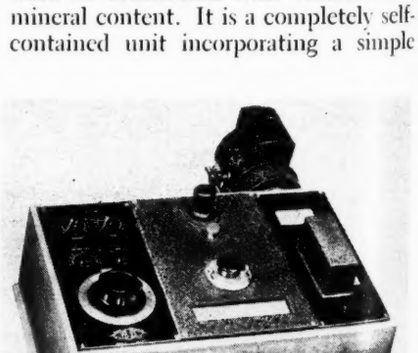


Variable speed transmission with built-in chain drive reducer.

reducer and with the output shaft in exact alignment with the input shaft. In this reducer, the chain drive operates in a bath of oil. Speed control is by means of a handwheel and is infinitely variable within predetermined limits.

Vitamin Assay Instrument

Pfaltz & Bauer, Inc., Empire State Building, New York, has developed the Model C fluorophotometer for use in the determination of vitamins and minerals. The instrument is particularly designed for accelerated routine control work in connection with vitamin and mineral content. It is a completely self-contained unit incorporating a simple



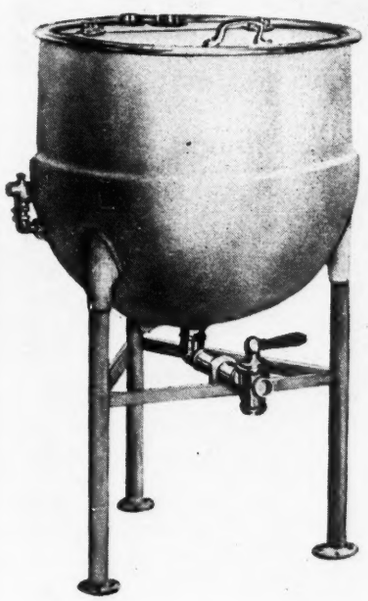
Fluorophotometer for use in control work on vitamins and minerals.

electrical circuit and eliminating the use of an amplifier and stabilizer. Features claimed for this new model are a novel slide carriage made to accommo-

date both the blank and the sample to be tested, and an automatic shutter which shields the sample from the light beam and cuts in the measuring circuit.

Stainless-Clad Kettle

GROEN MFG. CO., 4533 Armitage Ave., Chicago, has brought out the "Defense" kettle for food manufacture, in which stainless-clad steel furnished by Jessop Steel Co., Washington, Pa., is used as a material of construction. In this



"Defense" kettle for food products made from stainless-clad steel.

kettle, the entire inside and the cover are protected by a stainless steel surface, while the parts of the kettle that do not come into contact with the food products are of plain steel. Construction of this type is said to save four-fifths of the stainless steel that would be required if the kettle were made of stainless steel alone.

Self-Aligning Idler

AS a means of making conveyor belts last longer, Chain Belt Co., Milwaukee, Wis., has brought out a new self-aligning idler for flat belts. The purpose of this idler is to keep the belt central on its support and to prevent wear on the belt edges. The idler is designed so that if the belt runs to one side, it has a tendency to swivel the idler in a horizontal plane. If this does not immediately realign the belt, the belt will continue traveling to one side until it contacts the counterweighted end disk which is slightly larger in diameter than the conveyor roll. Contact with the counterweight tends to rotate it but, since it is a counterweight, it resists

INCREASE
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WITH "MECHANIZED" HANDLING
Put STANDARD CONVEYORS
TO WORK!
Get more production every hour of the day or night shift . . . provide a smooth, uninterrupted flow of materials and parts to men and machines . . . keep products moving through assembly and packaging operations without halt . . . be sure of dependable plant transportation with Standard Gravity and Power Conveyors. Hundreds of manufacturers—in both war and peacetime production—have found that Standard Conveyors gain added production hours—help substantially to accomplish more every working day.
Send for 80-page "Standard" Booklet
Fully illustrated—shows all types of Standard power and gravity conveyors for product and "package" handling—except bulk. Interesting and informative, you will find it a handy reference book on conveying methods. Write for Bulletin FI-10.
STANDARD CONVEYOR COMPANY
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FIRST FOR FASTER PRODUCTION

SEAMLESS STEEL CONTAINERS

DURABLE—
and EASY to CLEAN

Cold drawn to shape—not a weld or joint in their entire construction! No wonder Hackney Seamless Steel Containers are durable—able to stand up under exceptionally hard use. Then, too, they are sanitary—easy to clean and keep clean. Food product manufacturers are using them for holding foodstuffs, liquids, chemicals, ice, etc., as well as for food scraps . . . for inter-department handling of raw products during manufacturing processes. They are made in various capacities.

Hackney has had years of experience in working with all types of metals. Hackney Seamless Containers involve a competent use of modern manufacturing equipment and facilities, extensive research and an intimate knowledge of the users' requirements and the conditions under which they will be used. Conditions, today, demand restrictions on metals for products destined for other than war uses. However, there is no interruption of the knowledge, skill, imagination and Hackney's interest in product improvement. And their continuance is your assurance of the continued superiority of Hackney products.

Hackney

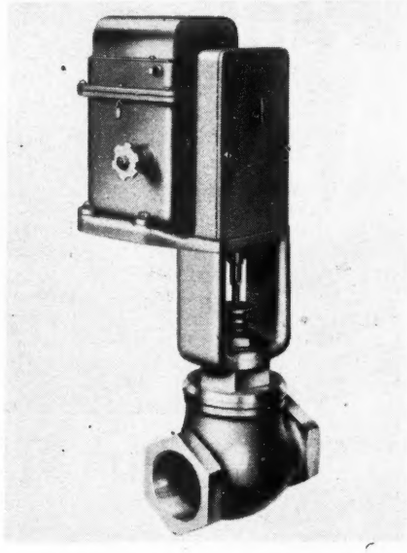
PRESSED STEEL TANK COMPANY
General Offices and Plant:
1457 S. 66th St.,
Milwaukee, Wisconsin

Containers for Gases, Liquids and Solids

this tendency to rotate and produces a counter force on the idler. This causes the idler to swivel rapidly and immediately forces the belt back into central position.

Control Valve

Barber-Colman Co., Rockford, Ill., has designed the "Microvalve" for use in the control of steam, water, oil or gas in air-conditioning systems, drying systems and industrial processes



Control valve for the control of steam, water, oil or gas.

where close regulation is required. This is a motor-operated valve with a proportioning type operator. The valve operator consists of a "Microtol" with the addition of an eccentric cam that operates the valve plunger. It is available in single seat, V-ported; double seat, V-ported; and double seat three-way valve body.

Pressure Transmitter for Instruments

Moore Products Co., H and Lycoming Sts., Philadelphia, Pa., has developed a pneumatic differential transmitter, the purpose of which is to measure and amplify small differential pressures and transmit the amplified pressure to an indicating, recording or controlling instrument. Important characteristics of this device include a constant ratio of amplification. This ratio may be varied to suit requirements, but in all cases, depends only upon a fixed ratio of bellows areas, and does not use any levers or sliding members, that might cause friction losses. The device is used in connection with the measurement and control of such variables as pressure, temperature, flow and level.

Dual Purpose Pumping Unit

Blackmer Pump Co., Grand Rapids, Mich., has brought out a combination rotary-centrifugal dual pumping unit for use where two dissimilar liquids must be handled through one unit. This unit is mounted on a single bed plate and is powered by a 4 hp. motor with gear head on one end to drive a rotary pumping unit and a shaft extension on the other end, direct-connected to a centrifugal pump. The rotary pump has a capacity of 44 gal. per min. at 50 lb. per sq. in. when handling fuel oil or similar liquids, while the centrifugal pump has a capacity of 35 gal. per min. at 25 lb. per sq. in. when handling water.

Plastic Fittings

Acadia Synthetic Products Division, Western Felt Works, 4115 Ogden Ave., Chicago, is now making molded fittings from Saran, a thermo-plastic product. These fittings are now available for tube sizes from $\frac{1}{8}$ in. to $\frac{3}{8}$ in. outside diameter. It is said that with the use of these fittings it is now possible to set up a complete chemically-resistant piping system without the use of any metal. The fittings are said to have a high tensile and bursting strength, to be non-corroding and non-aging, and to be usable with equal facility on plastic or metal tubes.

Low Temperature Insulation

The Building Materials Division, Armstrong Cork Co., Lancaster, Pa., has introduced "Foamglas," a cellular glass material for low-temperature insulation work. The manufacturers state that this material offers permanent insulating efficiency for cold storage rooms in food processing plants of all types.

"Foamglas" low-temperature insulating material.

It is stated that the structure of this cellular glass material bars the passage of water vapor and hence maintains maximum efficiency through the life of the construction. In addition, the material is fireproof and waterproof, and will not rot, mold or decay.

"Foamglas" is supplied in one easily erected board size of 12x18 in., in standard thicknesses of 2, 3, 4½ and 6 in. In applying this material, it can be sawed and worked with ordinary tools.

Blackout Switch

FOR plants desiring to have illuminated advertising signs, Photoswitch, Inc., 21 Chestnut St., Cambridge, Mass., has

Blackout switch for turning out outside lighted signs.

brought out a blackout switch designed to turn out the illumination in case of an emergency. The photoelectric mechanism of this switch is designed to observe a control street lamp and when this is turned off it turns out the sign that is being controlled.

Non-Slip Material

TO provide a non-skid surface on floors where water may collect, and as a substitute for the conventional rubber mat, the Philip Carey Mfg. Co., Lockland, Cincinnati, Ohio, has developed the "Corrugated Floor Runner." This is an asphalt composition material provided with a ribbed surface on the upper side to prevent slipping. It is available in rolls 36 in. wide and 30 ft. long. It is also available in the form of mats for small areas, in sizes 2x3 ft., 3x4 ft., 3x6 ft., and as stair treads in sizes 9x18 in. and 9x24 in.

Save Time in VITAMIN A Determinations

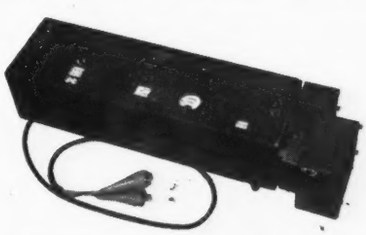
...Workers have indicated the ultra-violet absorption to be a more reliable index of Vitamin A content than antimony trichloride reaction with its attendant complications.
—Wilkie: U. S. Food & Drug Admin.

with the Beckman Spectrophotometer

The Beckman Spectrophotometer has already proved itself to be the fastest, simplest, and most accurate method for Vitamin A determinations. And, because the Beckman Instrument covers not only the visible and near ult.a-violet, *but the complete range of ultra-violet* down to 200 mmu—this is the *only* spectrophotometer capable of handling ALL types of modern vitamin determination and control work!

Step up the speed, accuracy, and convenience of *your* vitamin work with the BECKMAN Spectrophotometer—the one spectrophotometer with *full range* to cover all present day vitamin work as well as future developments in this field!

Important Features of the Beckman Spectrophotometer



▶ **Entirely Self-Contained:** The monochromator, light sources, phototubes, and electrical measuring circuit are all incorporated within the instrument to insure maximum convenience, ruggedness, and accuracy.

▶ **Easy to Operate:** Measurements are quick and simple to make. Direct readings in both % Transmission and Density can be made *simultaneously*.

▶ **Remarkably Versatile:** Interchangeable light sources, interchangeable phototubes, a monochromator with full range (200 mmu in ultra-violet to 2000 mmu in infra-red) enable the instrument to meet all the varying requirements of research and control work with no sacrifice in convenience or accuracy.

▶ **Highly Accurate:** Although unusually simple to operate and remarkably versatile, the instrument is extremely accurate over the full scale, even with low light intensities. Stray light effects are less than 1/10 of 1% over most of spectral range.

▶ **Ruggedly Built:** Optical parts are rigidly mounted in a massive heat-treated iron block, within a hermetically sealed metal case. All parts are designed for long life and sustained accuracy.

Send for complete information on the Beckman Spectrophotometer. Describe the application you have in mind and our experienced engineering staff will gladly make helpful suggestions on the use of this instrument in your particular work.

NATIONAL TECHNICAL LABORATORIES, South Pasadena, Calif.

Beckman INSTRUMENTS SPEED PRODUCTION ...REDUCE WASTE

A century of service—through peace and war—in good times and bad—Ryerson has served the food industries of America. Ten Ryerson Plants are stategically located for prompt, dependable steel-service. Our steel stocks, which normally contain over 11,000 different kinds, shapes and sizes, have been greatly reduced by the demands of the war. However, our remaining stocks are offered in accordance with the Government Priority Plan. We are always glad to work with you and offer our help in the most effective application and fabrication of all steel products.

Partial List of Ryerson Steels

Bars—Plates
Structurals
Sheets—Strip
Alloy and Tool Steels
Stainless Steel
Tubing
Reinforcing Bars
Welding Rod

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JUST OFF THE PRESS

BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Dehydraters—The production of dehydrated vegetables and fruits and the application of its recently designed equipment for the purpose is the subject of a publication of the Douthitt Corp., 221 No. La Salle St., Chicago.

Ejectors—Steam jet ejectors for the production of vacuum in industrial processing operations are described, with engineering data, in 6-page illustrated Bulletin W-205-B7A, of Worthington Pump and Machinery Corp. Harrison, N. J.

Heating, Cooling and Air-Conditioning—A condensed catalog of products useful in heating, cooling, refrigerating, air-conditioning and humidity control, has been issued as 12-page illustrated Catalog AC, by Carrier Corp., Syracuse, N. Y.

Materials Handling—Both "tight-end" and split steel conveyor pulleys are described in 4-page, illustrated Bulletin CP42, issued by American Pulley Co., 4200 Wissahickon Ave., Philadelphia, Pa.

Package Handling Conveyors—A line of conveyors engineered to meet all package handling problems is the subject of 24-page illustrated Catalog No. 307, issued by Standard Conveyor Co., No. St. Paul, Minn.

Scales—"The Story of Modern Industrial Weighing" is the title of an illustrated folder on the use of weighing machines in the packing of products—mostly foods—issued by The Exact Weight Scale Co., Columbus, Ohio.

Sifters—The "Unique" brush sifter for foods and other products, in various sizes and models, is described in 8-page illustrated Catalog No. 27-A, issued by Robinson Mfg. Co., Muncy, Pa.

PLANT SUPPLIES

Blackout Protection—The use of "Ozite" blankets as protection from flying splinters and damage during air raids is the subject of a recent publication of Clinton Carpet Co., Merchandise Mart, Chicago.

Circuit Breakers—Low-voltage air circuit breakers designed for use on alternating-current circuits up to 600 volts and direct-current circuits of 250 or 750 volts are described and illustrated in 12-page Catalog 2150, published by Roller-Smith Co., Bethlehem, Pa.

Low Temperature Insulation—Various types of low-temperature insulation, including corkboard, cork covering, mineral wool and "Foamglas," and their applications in milk and ice cream plants, are discussed in illustrated Bulletin No. I-276-342, issued by Armstrong Cork Co., Lancaster, Pa.

Paints—Wax-fortified paints, developed to reduce maintenance costs, to be dust and mar resistant, and water repellent, are described in Bulletin No. 4, of Industrial Maintenance Div., S. C. Johnson & Son, Inc., Racine, Wis.

Pipe and Fittings—Corrosion resistant pipes, tubes and fittings made of "Karbate," a carbon or graphite material impervious to seepage of liquids and gases, are described in 8-page illustrated Catalog Section M-8800A, published by National Carbon Co., Carbon Sales Division, Cleveland, Ohio.

Power Cable—"Interlocked-Armor" power cable, three conductor, for metal clad power circuits, is briefly described in leaflet No. GEA-3297A, published by General Electric Co., Schenectady, N. Y.

Protective Coatings—Various types of coatings for protecting the surfaces of materials from acids, alkalis or moisture are described in a bulletin issued by Protective Coatings, Inc., 10391 Northlawn, Detroit, Mich.

Pumps—General service centrifugal pumps, single stage, volute, type L, Nos. 3 to 6, in capacities up to 2,000 gal. per minute and heads up to 300 ft., are briefly described in Bulletin W-312-B2-C, published by Worthington Pump & Machinery Corp., Harrison, N. J.

Pumps—Single stage, open impeller, Type CY centrifugal pumps, 5 to 50 gal. per minute, for heads up to 45 ft., are described in Bulletin W-310-B11, by Worthington Pump & Machinery Corp., Harrison, N. J.

Rotary Pumps—A 24-page illustrated general catalog of rotary pumps, accessories and pump applications has been issued by Blackmer Pump Co., Grand Rapids, Mich.

Special Valves—Safety valves, relief valves, pressure gages and pertinent engineering data are contained in 32-page illustrated Supplementary Catalog No. 600, issued by J. E. Lonergan Co., 211 Race St., Philadelphia, Pa.

Step-Valve Pumps—In Bulletin 426, the action of a step-valve pump, used for handling viscous liquids and liquids containing a considerable percentage of solids, is explained by Milton Roy Pumps, 1,300 East Mermaid Ave., Philadelphia, Pa.

Traveling Cranes—In 16-page Catalog A-42 traveling cranes and their parts are described, with reproductions of installation photographs, by Reading Chain & Block Corp., Reading, Pa.

CONTROL EQUIPMENT

Control Equipment—A condensed index of automatic control and recording instruments has been issued as Bulletin No. DM002 by the Bristol Co., Waterbury, Conn.

Temperature Controls—A 36-page, illustrated condensed catalog of temperature control for industrial processes, heating, ventilating and air-conditioning has been issued as Form 1752 by Barber-Colman Co., Rockford, Ill.

MISCELLANEOUS

Care of Motors—"A Guide to the Wartime Care of Electric Motors" is the title of a 24-page timely reference for maintenance men, issued by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Essential Oils and Flavors—A new price list of flavors, essential oils and kindred products has been issued by Dodge & Olcott Co., 180 Varick St., New York.

Flavors and Essential Oils—A wholesale price list of flavors, essential oils and related products under the General Maximum Price Regulation has been issued by Fritzsche Bros., Inc., 76 Ninth Ave., New York.

Rubber Conservation—Detailed and definite suggestions for the proper care of industrial rubber equipment, such as hose, belting, packing, rubber-lined equipment, and so on, are contained in a 48-page illustrated book published by United States Rubber Co., Rockefeller Center, New York.

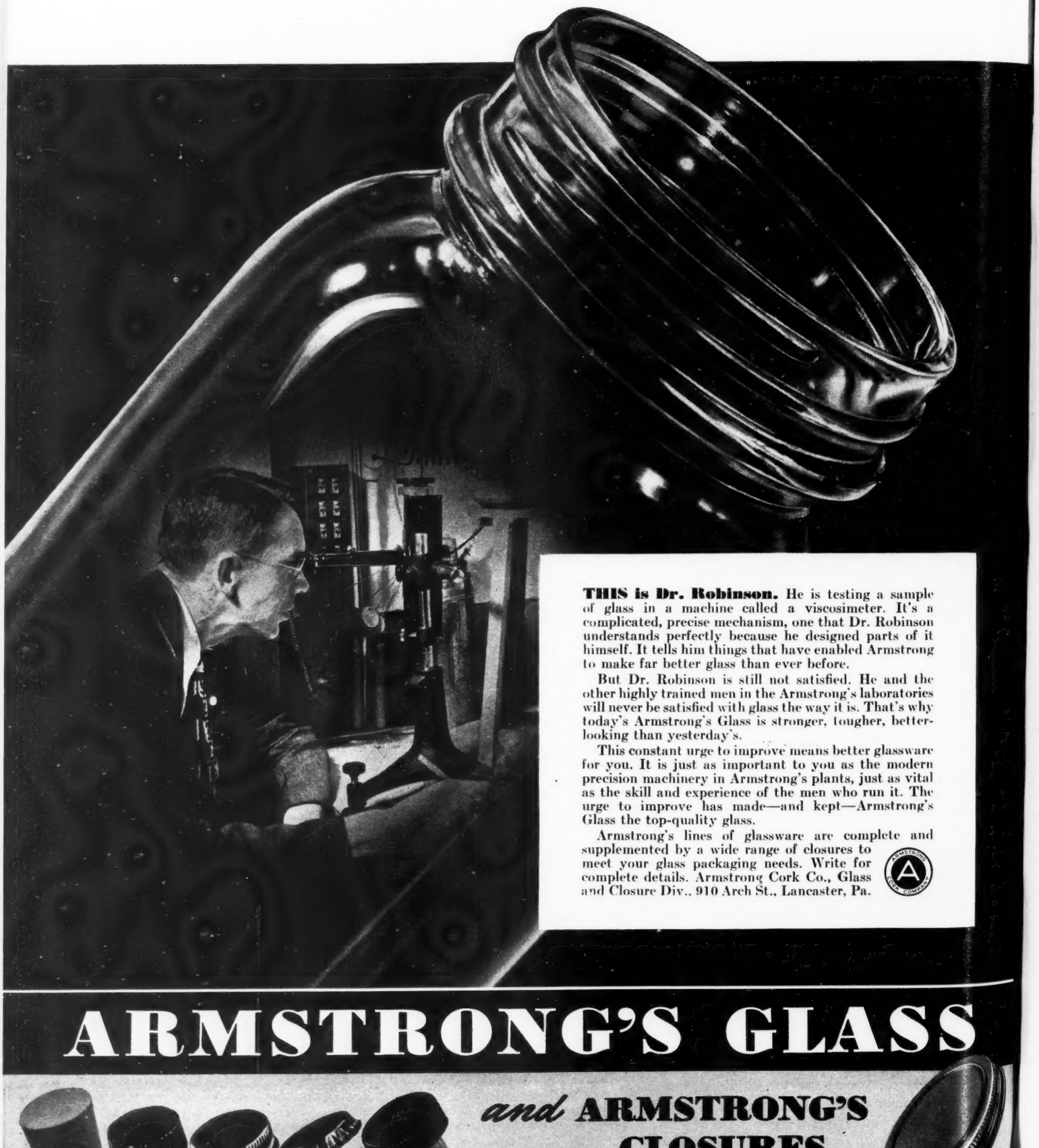
Spectrum Chart—A seven-color wall chart of the entire electro-magnetic spectrum, 30 x 40 in. in size, printed on heavy white cloth, has been issued at a price of $2 by Publications Section, 6-N-17, Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa.

Water Quality—"Water Handbook," containing information of methods of water analysis and the interpretation of water analyses, has been issued as a 64-page illustrated publication by W. H. and L. D. Betz, Gillingham and Worth Sts., Frankford, Philadelphia, Pa.

Welding of Stainless Steel—In a 24-page illustrated booklet, information is given on the welding of "Enduro" stainless steel by the principal processes now in use, by Republic Steel Corp., Cleveland, Ohio.

BETTER GLASS IS BORN HERE

...because this man is never satisfied



THIS is Dr. Robinson. He is testing a sample of glass in a machine called a viscosimeter. It's a complicated, precise mechanism, one that Dr. Robinson understands perfectly because he designed parts of it himself. It tells him things that have enabled Armstrong to make far better glass than ever before.

But Dr. Robinson is still not satisfied. He and the other highly trained men in the Armstrong's laboratories will never be satisfied with glass the way it is. That's why today's Armstrong's Glass is stronger, tougher, better-looking than yesterday's.

This constant urge to improve means better glassware for you. It is just as important to you as the modern precision machinery in Armstrong's plants, just as vital as the skill and experience of the men who run it. The urge to improve has made—and kept—Armstrong's Glass the top-quality glass.

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ARMSTRONG'S GLASS

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PATENTS

Cheese Flavoring Made by Homogenizing Anhydrous, Refined, Elible Oil With Low-moisture Cheese Dried at Below 140 Deg. F.—Bert A. Jordan, Elgin, Ill., Forest H. Clickner, South River, N. J., and Arthur B. Erekson, Plymouth, Wis., to Borden Co., New York, N. Y. No. 2,289,576. July 14, 1942.

Ice Cream Made in Freezer Equipped With Triple-action Agitator—Charles F. Weinreich, Des Plaines, Ill., to Cherry-Burrell Corp., Wilmington, Del. No. 2,289,613. July 14, 1942.

Baking Oven Designed to Provide Heat-producing Chamber and Baking Chamber Equipped With Suction-blower Air-circulation Control—John V. Cook, to Peterson Oven Co., Chicago, Ill. No. 2,289,629. July 14, 1942.

Bread Sliced in Machine Fitted With Adjustable Cutting Blades—Harry J. Criner, one-half to A. G. Bush, Davenport, Iowa. No. 2,289,630. July 14, 1942.

Fish Tissues Treated With Active Oxygen Absorbent to Stabilize Oil Content and Permit Recovery of Improved Quality Oils—Kenneth C. D. Hickman, to Distillation Products, Inc., Rochester, N. Y. Nos. 2,289,780 and 2,289,781. July 14, 1942.

Citrus Fruit Treated With Heated Salt Solution to Rupture Skin Membrane and Permit Removal of Oil Preliminary to Other Processing—Gregg Maxcy, Sebring, Fla. No. 2,289,851. July 14, 1942.

Foods Filled Into Containers With Mechanical Pressure to Give Solid Pack—Henry Mondloch, Waukegan, Ill., to Food Machinery Corp., San Jose, Calif. No. 2,289,852. July 14, 1942.

Glyceride Oils Stabilized Against Oxidative Deterioration by Dispersion in Water Containing Tyrosine or Its Esters, Heating to at Least 145 Deg. F. and Breaking of Dispersion to Recover Stabilized Oil—Sidney Musher, New York, N. Y., to Musher Foundation, Inc. No. 2,290,064. July 14, 1942.

Chewing Gum Made From Finely Divided Solid Particle Base and At Least One Sugar By Forming Into an Homogeneous Mixture and Compressing—Christopher F. Thomas, Toronto, Ont. No. 2,290,120. July 14, 1942.

Bread Sliced in Machine Equipped With Fixed Loaf-supporting Unit and Series of Alternate Reciprocating Knives — Sander Debus, Hastings, Neb., to U. S. Slicing Machine Co. No. 2,290,169. July 21, 1942.

Liquid Ice Cream Mix in Valved Container Subjected to Gas Pressure and Agitation Preparatory to Freezing Into Aerated Semi-solid by Release of Gas Pressure—Clarence M. Smith, Jr., to Aeration Processes, Inc., Columbus, Ohio. No. 2,290,214. July 21, 1942.

Solids-containing Liquid Dehydrated in Unit Consisting of Dehydrating Chamber Equipped With Air-mixing and Movement-directing Device—Joseph M. Hall, Chicago, Ill., to Drying & Concentrating Co. No. 2,290,470. July 21, 1942.

Fruit Treated by Contact With Controlled Concentration of Gas in Closed Chamber—Martin C. Hanson, Riverside, and Jagan N. Sharma, Los Angeles, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,290,471. July 21, 1942.

Fruit Treated With Gas Under Varying Temperature Conditions in Confined Chamber in Presence of Control Agent Which Reacts With Gas to Maintain Concentration of Gas in Container Atmosphere Regardless of Temperature Fluctuation—Arthur F. Kalmar and William R. Huguenin, Riverside, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,290,473. July 21, 1942.

Beef Cuts Aged by Holding in Liquid Edible Oil Under Refrigeration—John M. Ramsbottom, to Industrial Patents Corp., Chicago, Ill. No. 2,290,493. July 21, 1942.

Gelatin Prepared From Stock Material by Treating With Dilute Solution of Caustic Soda Containing Small Quantity of Water Soluble Soap—Edward F. Christopher, to Industrial Patents Corp., Chicago, Ill. No. 2,290,538. July 21, 1942.

Corn Debutted and Husked in Unit Equipped With Conveyor for Returning to Feeding Passageway Ears Which Fail to Go Through Debutting Channel—Wm. W. Morral and Samuel E. Morral, Morral, Ohio. No. 2,290,699. July 21, 1942.

Chewing Gum Made to Contain Gum Base and Nontoxic Alkaline Earth Metal Peroxide Mixed and Coated With Hydrogenated Fatty Oil to Keep Peroxide Stable Until Wetted—Franklin V. Canning, Douglaston, N. Y., to Gum Laboratories, Inc., Clifton Heights, Pa. No. 2,290,862. July 28, 1942.

Lactic Acid Recovered Through Hydrolysis of Lactic Acid Ester—Samuel M. Weisberg and Edwin G. Stimpson, to Sealtest, Inc., Baltimore, Md. No. 2,290,926. July 28, 1942.

Equipment Wash Water Made to Contain Gluconic Acid and Hydrogen Dioxide in Sufficient Quantities to Counteract Bicarbonate Hardness—Henry W. Lehmkuhl and Myron W. Cucci, to Milk Plant Specialties Corp., Rochester, N. Y. No. 2,291,085. July 28, 1942.

Shell Eggs Mechanically Cleaned During Passage Through Rotatable Drum—Laurence Escobar, Salinas, Calif. No. 2,291,153. July 28, 1942.

Nondiastatic Powdered Malt Extract in Quantities Between 3 and 16 Percent by Weight Added to Pan Cake and Waffle Flour Mixes So That Each Malt Particle Gets Individual Coating of Flour—Fred S. Carbon, Buchanan, Mich. No. 2,291,529. July 28, 1942.

Beers and Ales Freed From Colloidally Dissolved Albumens by Treatment With Aluminum Silicates—Eberhard Heimann, Berlin-Schoneberg, and Johann Friedrick Meyer, Potsdam, Germany, to A. G. für Bier und Weinprodukte, Zurich, Switzerland. No. 2,291,624. Aug. 4, 1942.

Vegetable Foods Given Protective Coating by Subjecting to Vacuum, Followed By Flooding With Edible Coating Material Preliminary to Application of Pressure to Cause Impregnation and Heat Treating to Between 110 and 140 Deg. F.—George A. Fisher, Indianapolis, Ind. No. 2,291,704. Aug. 4, 1942.

Meat Sliced on Electrically Operated Cutting Machine Fitted With Series of Knives Equally Spaced Apart and Replaceable by Substitute Cutter Disks—Aldrich L. Jackson, Minneapolis, Minn. No. 2,291,809. Aug. 4, 1942.

Dry Gelatin Heated in Ethyl Alcohol to Slightly Less Than 95 Deg. C. to Increase Its Viscosity Without Substantially Decreasing Its Bloom—Edward F. Christopher, to Industrial Patents Corp., Chicago, Ill. No. 2,292,022. Aug. 4, 1942.

Shrimp Graded to Size by Mechanical Means—Ralph V. Grayson, Houston, Tex., to Kroger Grocery & Baking Co., Cincinnati, Ohio. No. 2,929,068. Aug. 4, 1942.

Coffee Beans Roasted by Exposure to Radiation Between 6,500 and 16,000 A. Units—Mark Weisberg, Providence, R. I. No. 2,292,255. Aug. 4, 1942.

Cereal Cooked With Water, Subjected to Mechanical Pressure to Alter Internal Structure, and Dried to Water Content Suitable for Puffing in Explosion Gun—John L. Kellogg, Jr., by Mary M. Kellogg, Administratrix, Wilmette, Ill., to Helen L. Kellogg, Chicago, Ill. No. 2,292,274. Aug. 4, 1942.

Gelatin Extracted From Stock in Tank Fitted With Rotatable Container and Hollow Channels Through Which Liquid Can Be Pumped—William V. Knoll, Dayton, Ohio. No. 2,292,276. Aug. 4, 1942.

Gelatin Material Stock Treated With Water-soluble Alkaline Earth Metal Salt Preliminary to Treatment With Dilute Solution of Alkali—Edward F. Christopher, to Industrial Patents Corp., Chicago, Ill. No. 2,292,315. Aug. 4, 1942.

Skins Removed From Pork Bellies by Mechanical Means—Nicholas J. Dziedzic and Charles L. Straeten, to Industrial Patents Corp., Chicago, Ill. No. 2,292,319. Aug. 4, 1942.

The Bad Boys Are on the Spot

IN DEMOCRATIC countries, police departments nab "bad actors" and keep them out of circulation. In food processing, we also encounter "bad actors"—elements and conditions that rob our products of freshness, turn them rancid, destroy their flavor. But vigilant food technologists are already on their trail. They know, for example, that they must protect food products from irradiation by light . . . exclude oxygen or excessive humidity . . . guard against insect infestation.

Recent research shows that copper and iron, even in minute traces, are "bad actors." In the manufacture of shortening, they are eliminated to increase the rancidity resistance of various fats and oils. They affect the stability of dairy, bakery, and meat products—and practically any food product that contains the slightest traces of fats or volatile flavors easily oxidized.

Yes, they even affect the stability of certain vitamins—Vitamin "C," for example, and some of the "B" group.

We have reduced the copper and iron in Diamond Crystal Salt until today they represent less than 1 part per million. Salt products in general, however, may contain significant amounts of both copper and iron. Why not check up on the salt you are now using? And if you would like our help in keeping the "bad actors," copper and iron, down to a minimum in your plant, drop a note to our Director of Technical Service, who will be glad to cooperate. Diamond Crystal Salt Co., Inc., St. Clair, Mich.

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A LEADER TODAY

IN 1892, in a Virginia valley noted for its vast deposits of pure salt, Mathieson began the construction of the first of three great factories. Over a period of half a century, they were to supply America's growing industries with vital chemicals. Today—fifty years later—the Mathieson plants at Saltville, Va., Niagara Falls, N. Y. and Lake Charles, La., are working twenty-four hours a day to supply the nation's *war* industries with the "raw materials of victory."

This is the over-all picture of a typically American enterprise —The Mathieson Alkali Works. It is a story of growth and progress in chemical research . . . in developing new products . . . and in devising more efficient methods of handling and transporting chemicals.

Among Mathieson's early achievements was the development of the Castner electrolytic cell for producing chlorine and extremely pure caustic soda. The first to make bleaching powder in the United States, Mathieson pioneered the manufacture of synthetic ammonia, liquid chlorine and such outstanding chlorine products as calcium hypochlorite and sodium chlorite. Chlorine, today in great demand for war production, is also safeguarding the health of our fighting men on all fronts as calcium hypochlorite, the *mobile* chlorine carrier.

These are but a few milestones in the fifty years of Mathieson Chemicals. They are tangible evidence of the drive and initiative which have marked Mathieson's rise from modest beginnings to a place of leadership in the field of industrial chemicals.

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The Mathieson Alkali Works (Inc.) 60 East 42nd Street, New York, N. Y.

Precooked Rice Partially Dried and Wrapped in Vegetable Parchment Preparatory to Retorting in Sealed Container—Nicholas C. Coan, San Jose, Calif. No. 2,292,431. Aug. 11, 1942.

Fruit Given Surface Treatment in Fluid Applying Apparatus at One or More Stations Along Line of Travel—Harry E. Di Cristina, Davenport, Fla., to Holly Hill Fruit Products, Inc. No. 2,292,434. Aug. 11, 1942.

Foods Dehydrated Under Vacuum at Freezing Temperatures—James C. Irwin, Jr., Kansas City, Mo., to United States Cold Storage Corp., Wilmington, Del., and D. C. Pfeiffer and J. M. Hill, Dallas, Tex. No. 2,292,447. Aug. 11, 1942.

Orange Juice Beverage Prepared and Packaged in Zone of Inert Gas—Ronald B. McKinnis, to Sunshine Foods, Inc., Winter Haven, Fla. No. 2,292,460. Aug. 11, 1942.

Doughnuts, Cakes, Cookies and Other Batter Products Formed on Small-scale Basis by Mechanical Means—Ward Rush, Los Angeles, Calif. No. 2,292,661. Aug. 11, 1942.

Fruits and Vegetables Graded on Portable Sizing Machine—David Claude Vedder, El Centro, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,292,678. Aug. 11, 1942.

Glyceride Oils and Fats Freed From Gums, Color Impurities and Free Fatty Acids in Three-stage Refining Process — Benjamin Clayton, Houston, Tex., to Refining, Inc., Reno, Nev. No. 2,292,822. Aug. 11, 1942.

Containers Filled With Heated Liquids and Sealed Under Vacuum—Douglas M. McBean, Rochester, N. Y., to Beech-Nut Packing Co., Canajoharie, N. Y. No. 2,292,887. Aug. 11, 1942.

Fruit Turned Into Desired Position by Impact of Fluid Jet—Edmond R. Dudley, Jr., Napa, Calif., one-fourth to LeRoy Hanscrom, Berkeley, Calif. No. 2,293,121. Aug. 18, 1942.

String Beans Snipped and Sliced on Large-scale Basis by Mechanical Means—Chaucer G. John, Dallas, Tex. No. 2,293,141. Aug. 18, 1942.

Rennet-precipitated Casein Dissolved in Water Solution of Tetra-Sodium Pyrophosphate—Henry V. Dunham, Cambridge, N. Y., to Borden Co., New York, N. Y. No. 2,293,385. Aug. 18, 1942.

Coffee Ground by Action of Unglazed Porcelain Corrugated Surfaces—Robert Brown, New York, N. Y. No. 2,293,422. Aug. 18, 1942.

Ice Cream and Similar Viscous Products Trade Marked During Packaging by Incorporation of Slugs of Contrasting Colored Substances—David H. Freedman, Jr., New Haven, Conn. No. 2,293,538. Aug. 18, 1942.

Vegetables and Like Ground Into Uniformly Sized Small Particles Preparatory to Multistage Dehydration—Berthold G. Freund, New York, N. Y. No. 2,293,738. Aug. 25, 1942.

Canadian Patents

Heat Exchange Between Food Product and Refrigerant Accelerated by Flowing Primary Heat-exchange Medium Through Middle One of Three Concentric Zones, and Secondary Medium Through Inner and Outer Zones While Containers of Food Move Through Inner Zone—Wm. J. Finnegan, Hollywood, Calif. No. 406,145. July 21, 1942.

Foods Frozen in Successive Precooling, Prefreezing, Freezing and Tempering Stages While Following Predetermined Path Through Casing Having Spaced Baffles—Wm. J. Finnegan, Hollywood, Calif. No. 406,146. July 21, 1942.

Bottled Beverages Protected by Cap Having Metal Cover With Tear-off Tab, Cover Being Lined With Paper-like Material—Anthony J. Marek, to Kork N-Seal, Ltd., London, England. No. 406,421. July 28, 1942.

Starch Directly Hydrolyzed in Aqueous Medium by Action of Enzymes and Coenzymes on Starchy Products in Which They Occur Naturally—Firmin Boinot, to Usines de Melle, Melle, Deux Sevres, France. No. 406,431. July 28, 1942.

BOOKS

Meat Technology

MICROBIOLOGY OF MEATS. By L. B. Jensen. Published by The Garrard Press, 119-123 W. Park Ave., Champaign, Ill., 1942. 252 pages; 6x9¼ in.; cloth. Price, $4.

Because it deals with the industrial microbiology of meat foods, this book is of practical value to those engaged in meat packing operations. The author, being chief bacteriologist of Swift & Co., has the background necessary to the presentation of his material in a form useful in the meat industry.

Discussed in the various chapters of the book are effects of sodium nitrate, gaseous fermentation, green discolorations, action of microorganisms on fats, ham souring, microbiology of beef, bacteriology of sausage, microbiology of bacon, control of microorganisms, bacteriology of spices, salt, sugar, paper and wood, and food poisoning of bacterial origin.

It is not necessary to be a bacteriologist or chemist to profit from the information in this work, because in many instances, the import of technological fact is interpreted in terms of plant operations.

Vitamin Values of Foods

A COMPILATION OF THE VITAMIN VALUES OF FOODS IN RELATION TO PROCESSING AND OTHER VARIANTS. By Lela E. Booher, Eva R. Hartzler and Elizabeth M. Hewston. Published as Circular 638 by the U. S. Department of Agriculture, 1942. 244 pages; 6x9 in.; paper. Price, 25 cents.

Available data on the vitamin content of foods in relation to variety of plant, breed of animal, method of cultivation or feeding practice, place of production or source of material, method of cooking, processing, storage, variations in degree of maturity and methods of analysis are given in this circular. The data are presented in a table occupying 223 pages. Dehydrated vegetables are not covered.

Useful Reagents

CHEMICAL SOLUTIONS. By Frank Welcher. Published by D. Van Nostrand Co., 250 Fourth Ave., New York, N. Y. 1942. 404 pages; 9¼x6¼; cloth. Price, $4.75.

Indicators, special test reagents, stains, fixatives, or culture media, as well as standard acids and bases and salt solutions, are frequently needed in the laboratory, but directions for their preparation are usually scattered through textbooks and handbooks in such a way that they are not readily accessible to the chemist when such solutions must be prepared. This book collects in one place the methods for preparing the solutions most frequently needed. Only solutions commonly used in routine analytical or experimental work are given. A large number of the solutions used in food analysis and food plant control testing are included.

The solutions are listed alphabetically, with cross references where more than one name is used. An index classifies the reagents according to their uses. This should be helpful in locating reagents whose use is known but which may be listed under different names, and also in suggesting suitable reagents for various tests. There are long lists of culture media and staining solutions. Over 50 acid-base indicators are mentioned, classified alphabetically by name and also by pH range, covering the entire field from pH 0.1 to 14.0.

The book is intended for use only by those with some laboratory training and detailed directions for common laboratory operations are omitted. The text does include uses for the solution, test procedure in all cases where this can be given briefly, a list of interfering substances, sensitiveness of the test reagent and general remarks regarding the keeping qualities, methods of storage, and so forth, of the various reagents. References are given to sources of further information.

Polarimetry and Sugar

POLARIMETRY, SACCHARIMETRY, AND THE SUGARS. By Frederick J. Bates and associates. Published as Circular C440 by National Bureau of Standards, U. S. Department of Commerce, Washington, D. C. 1942. 810 pages; 6x9¼ in.; cloth. Price, $2; for sale by Superintendent of Documents, Washington, D. C.

Carbohydrate chemistry and its applications in industry are greatly dependent upon the polariscope. Which explains the association of the subjects of this book.

The treatise explains the use of polarized light for industrial, analytical and theoretical purposes. Part 1 discusses polarized light, polarimeters, saccharimeters and accessory apparatus. Part 2 deals with raw and refined sugars and sugar products, and Part 3 with the preparation and properties of the sugars and their derivatives. Part 4 is general information.

This work supersedes National Bureau of Standards circulars 12 and 44, the latter being issued in 1914 and revised in 1917.

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Letters to the Editor

You Can Get Good Poultry, Lady

To the Editor
of FOOD INDUSTRIES:

Progressive poultry packers of this country object to the condemnation of their methods and practices based on visits to merely a few plants within 350 miles of Chicago, as published in the June issue of FOOD INDUSTRIES. The criticisms are based on methods that are the exception, rather than the rule. Poultry packers are interested in improvement. They have made much progress and they are hard at work on further improvements.

Perhaps some large packers have not been interested in adjusting their operations to meet the individual fads and fancies of one operator, even though three cars of poultry per year might be involved. Restaurants and other public eating places don't change their practices for an individual customer either.

Few poultry packers ruin good raw material. Loss in quality through improper handling and preparation after the poultry leaves the hands of the packers is not uncommon. The implications of the article, if it is not carefully and thoughtfully analyzed in the face of true facts, are unfair and unjust to the large number of efficient progressive poultry processors who are representative of the industry.

The poultry industry, as an industry, is new. Most of the developments in mechanical equipment have been made within the past 20 years. I believe that the restaurant industry dates back to antiquity. There were probably restaurants in ancient Egypt, at least Egyptologists tell us that the span of life was very short at that time. Our poultry people are still naive, they can probably learn much from some restaurant owners.

When a customer asks for a haunch of Pategonian partridge, they heavn't learned the trick of running back and dragging out whatever they may have in stock. Perhaps sometime we will have plant managers who will furnish all Blue Andalusian chickens for the customer who has decided to prefer that breed. But we know that there is more difference between individuals within a breed of poultry than between good individuals of the different meat breeds.

I am certain that we are so profit-minded in this most competitive industry that whenever going to the extra expense of grading out breeds of poultry separately to fit the whims of a purchaser is profitable, we shall do so in spite of the problems involved. I know of no industry that is more attentive to possibilities for minute savings or added economies in operation; profit margins generally have been narrow.

Our leading operators have good equipment. They have installed stainless steel and enameled metal equipment for the distinct purpose of improving sanitation. Time and motion studies have been made to improve operating methods in some plants. Carelessness, waste and inefficient operation are uncommon, rather than the rule.

However, there are still problems and the industry is moving steadily forward. During the past year the organized research program in the poultry and egg industry has continued to expand rapidly. The expansions include the poultry products laboratory at Iowa State College, which has been established with industry support, and research activities in the poultry industry fields by other educational institutions, as well as in the private laboratories of the large forward-looking poultry packers. These re-

How Metso Cleaners Prevent Waste

LESS DOES MORE

Metso's uniform cleaning strength is long sustained at a high degree of activity. Because of this efficiency you use less cleaner. Most operations in food plants take less than one ounce per gallon of water.

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search organizations have added and are adding to the reliable fund of factual information on methods of improving products and operations.

Also, the annual fact-finding conference of the Institute of American Poultry Industries maintains a record in attendance and industry interest that is comparable, if not superior, to that in any other industry of its size.

Do these facts indicate an indifference on the part of poultry packers to the needs and requirements of their customers?

Like any other high-quality commodity, best quality poultry is available and can be had in abundance if the customer will proceed as he does to obtain the quality of automobiles, wearing apparel, yes, even to "milady's hat" and other "better things of life," he wants. With the recent rapid increase in eviscerated poultry of high quality, and rapid expansion in the number of retail stores selling good eviscerated poultry, truly fine table poultry is more readily available to the discriminating consumer than ever in the past.—HARRY E. DREWS, *Ottumwa, Iowa.*

About Congressmen

To the Editor
of FOOD INDUSTRIES:

Don't hold Congress responsible for what has been forced "down their collective throats" but rather hold them responsible for allowing it to be forced down.

Its doubtful if any of our Congressmen are "brainy" enough (if that's what you call it) or crazy enough to formulate the kind of legislative acts that have been so outstanding the last nine years.

These acts have been handed them for passage and they have thought the majority of the people wanted them.

There is only one place to put the blame for all this "junk legislation" and that is the source of its origination which is the administrative branch of our government.

Our problem is to get law-making back into the hands of our Congressmen!

And then our next problem is to have our business men, with other citizens, sponsor practical, honest men for office and not let politicians run the show.

We have done it in our community and it can be done in every community and nation wide by people who care and have the will.—E. WALDO WARD, JR., *Sierra Madre, Calif.*

The above is by way of comment on the editorial, "In Which We Become Cynical About Ourselves," FOOD INDUSTRIES, August, 1942, page 36.—The Editors.

Jessop Silver-Ply Stainless-Clad Steel provides the protection of a stainless surface for quality control and at the same time aids conservation of vital alloys. Silver-Ply Stainless-Clad Steel is a composite sheet or plate in which a layer of stainless steel has been inseparably united with a mild steel backing. It offers the corrosion resisting properties of solid stainless on the clad side—with savings up to 45% in material costs.

If your operations involve processes where corrosion of equipment must be avoided and product purity must be maintained, Silver-Ply Stainless-Clad Steel may solve your problems, for it is corrosion resisting, tarnish proof and easy to clean.

Write for descriptive booklet listing its many advantages.

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Its principle is wholly different. There is no vortex, no air to affect the mixture. Only a fraction of the mass is worked at one time, creating more uniform dispersion. The material is rapidly forced up from the air-free bottom by the stationary turbine fins. With tremendous pressure and turbulence, the flow surges upward, outward and down. The entire batch completes this cycle in just a minute or two. No clamping to tank, no setting at angle, no vibration.

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England Concentrates Food Manufacturing

(*Continued from page 42*)

ample, the scheme for the concentration of the chocolate industry will mean that 'loose chocolate' will virtually disappear and the output of the industry will consist only of 'block chocolate, filled blocks, and enrobered count lines'."

This two-part formula has obvious advantages. It enables the industry to make its maximum contribution to the national effort without imposing unnecessary hardship on any particular section of the industry. In actual practice it has been found possible to allow firms originally scheduled for closing to retain a corner of their factory, and their elderly workers and those who cannot be easily transferred, with which to carry on a small portion of the business. At the close of the war this small group will be the nucleus of the enlarged business when it resumes less restricted operations. A further advantage of this policy is that it avoids the closing of innumerable small firms for whose premises and labor there is no other outlet.

Tunnel Dehydraters and Their Use with Vegetables

(*Continued from page 46*)

Experiment Station Bulletin No. 337, 1921.
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Brief Summaries Of Grade Standards

(*Continued from page 60*)

If the color of the peaches is only fairly good and fairly uniform, a score of 12 to 14 points may be given. "Fairly good and fairly uniform" means that the peaches may vary in shades of a typical color which is equal to, or better than, Plate 9, L-1. Peaches that fall into this classification shall not be graded above U. S. GRADE C or U. S. STANDARD, regardless of the total score for the product.

Peaches that are noticeably variable in color or otherwise fail to meet the requirements of the above paragraph may be given a score of 0 to 11 points and shall not be graded above U. S. GRADE D, regardless of the total score for the product. If more than 25 percent by weight of the peaches have the appearance of green fruit or if the peaches are definitely off-color for any reason, the peaches shall not be graded above OFF-GRADE, regardless of the total score for the product.

The factor of absence of defects has reference to the degree of freedom from harmless extraneous material (such as stems or leaves), peel, pits, pieces of pit, and damage from mechanical, pathological, insect, or other injury. "Blemished units," are units that are blemished with scab, hail injury, discoloration, or other abnormality covering an aggregate area exceeding the area of a circle ¼ in. in diameter. Units with black or very dark spots, worm holes, or serious insect damage are considered blemished units, regardless of the area of the injury. "Normal shape" means that the halves retain their original conformation although there is evidence of trimming. Halves with holes through the unit or halves that possess deep gouges in the back or sides are not of normal shape. "Crushed or broken units" are units that have been crushed or broken to the extent that they have lost their normal shape. Peach halves that are slightly split from the edge to the pit cavity are not considered broken unless the units are not of normal shape.

Under the factor of character of fruit consideration is given to the texture and condition of the flesh—its firm-

ness or tenderness—of the peaches. Slight fraying which occurs in properly matured peaches and which affects not more than 25 percent of the circumference of the cut edge of the half is disregarded. Halves of peaches are considered "excessively frayed" when this condition exceeds 25 percent of the circumference of the cut edge. "Mushy" peaches are peaches that are so soft they present a pulpy mass.

When certifying samples which have been officially drawn and which represent a specific lot of canned clingstone peaches, the grade will be determined by averaging the score of all containers, provided not more than one-sixth of the containers fail in some respect to meet the requirements of the grade indicated by the average score.

However, none of the containers may fall more than 4 points below the minimum score for the grade indicated by the average score, and if one-sixth or less of the containers fail to meet the requirements of the indicated grade by reason of a limiting rule, all containers for the limiting factor must be within the range for the grade indicated by the average total score.

This tolerance does not apply if any container falls below any applicable standard of quality promulgated under the Federal Food, Drug, and Cosmetic Act.

ISSUED: June 5, 1942
EFFECTIVE: July 1, 1942

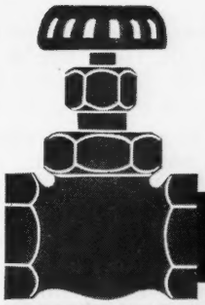
Canned Freestone Peaches

U. S. GRADE A or U. S. FANCY canned peaches are units of peaches of similar varietal characteristics which possess a normal flavor and which are of such quality with respect to color, uniformity of size, absence of defects, and character of fruit as to score not less than 90 points when scored in accordance with the scoring system outlined herein.

U. S. GRADE B or U. S. CHOICE canned peaches are units of peaches of similar varietal characteristics which possess a reasonably good and reasonably uniform color, are reasonably free from defects, possess a reasonably tender texture, possess a normal flavor, and are of such quality with respect to uniformity of size as to score not less than 75 points.

U. S. GRADE C or U. S. STANDARD canned peaches are units of peaches of similar varietal characteristics which possess a fairly good and fairly uniform color, are fairly uniform in size, are fairly free from defects, possess a variable texture, possess a normal flavor, and score not less than 60 points.

U. S. GRADE D canned peaches may be noticeably variable in color but not



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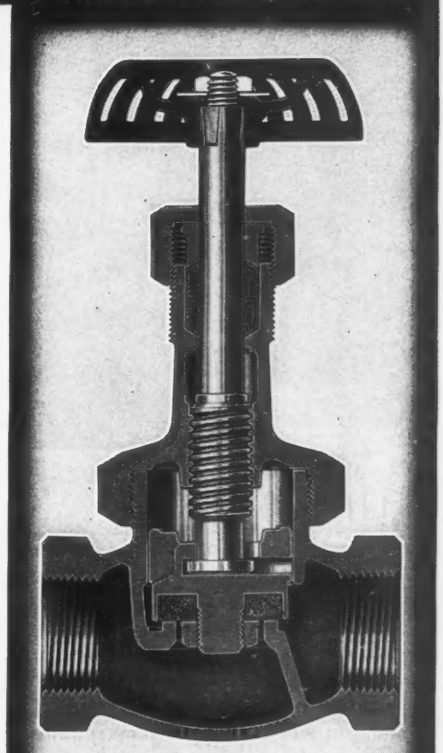

Fig. 123 "N-M-D"
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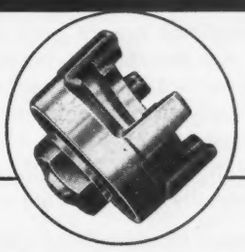

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BOSTON CHICAGO PITTSBURGH LOS ANGELES

definitely off-color; may be noticeably variable in size; are fairly free from pathological defects; may possess mechanical defects and may contain not more than 1 sq. in. of peel (in peeled peaches) per lb. of net contents, nor more than 1 pit or 1 piece of pit per 100 oz. of net contents; may possess a noticeably variable texture, and may be very soft, with not more than 50 percent by weight of mushy fruit; and possess a normal flavor.

Peaches of this grade that are packed in "water, slightly sweetened" will be certified with the additional statement "Seconds." Peaches of this grade that are packed in water will be certified with the additional statement "Water grade."

Canned peaches that fall below the Standard of Quality promulgated under the Federal Food, Drug, and Cosmetic Act shall be certified with the additional statement "Below Standard in Quality," together with the reason for so certifying.

U. S. GRADE C (Solid-Pack) canned peaches are peaches packed without added water or sirup that meet the requirements for U. S. GRADE C.

U. S. GRADE D (Solid-Pack) canned peaches are peaches packed without added water or sirup that meet the requirements for U. S. GRADE D.

OFF-GRADE canned peaches are peaches that fail to meet the requirements of the foregoing grades.

U. S. GRADES A, B and C of canned freestone peaches are usually packed in sirup. Sirup "cut-out" requirements, however, are not incorporated in the grades of the finished product since sirup, as such, is not a factor of grade for the purpose of these grades.

Canned peaches will be certified as to grade without regard to sirup density, but in each instance Federal inspection certificates will indicate the density of sirup found upon examination. When samples are officially drawn, the designation of sirup will be based upon the average sirup density of all containers examined, provided the range of variability is within the limits of good packing practice. For definitions of sirup grades see "CANNED YELLOW CLINGSTONE PEACHES." above.

The container shall be filled with freestone peaches as full as practicable without impairment of quality. The product and packing medium shall occupy not less than 90 percent of the total volume capacity of the container. Freestone peaches that have not been packed as full as possible without impairment of quality will be certified as "Below Standard in Fill."

Drained weights of canned Solid-Pack freestone peaches are determined by emptying the contents of the can upon a circular sieve of proper diameter containing 8 meshes to the in. (0.097-in. perforations) and allowing to drain for 2 minutes. A sieve 8 in. in diameter is used for No. 2½ cans, and a sieve 12 in. in diameter is used for No. 10 cans.

When certifying samples which have been officially drawn from lots of canned Solid-Pack freestone peaches, compliance of the entire sample with recommended minimum drained weights will be determined by averaging the drained weights of all containers in the sample, provided the range of variability is within the limits of good packing practice. If the average thus obtained is not less than the recommended drained weight shown in Table No. 1, the samples will be certified without exception.

Except as provided above, cans of Solid-Pack freestone peaches that fall below the recommended minimum drained weight will be certified with the additional statement "Below recommended minimum drained weight."

The grade of canned freestone peaches may be ascertained by considering, in addition to other foregoing requirements, the following factors: Color, uniformity of size, absence of defects, and character of fruit.

Under the factor of color, the uniformity and the intensity of the typical color are considered. The factor of color shall not be scored when grading spiced peaches, but the color shall be normal for this type of product.

The factor of absence of defects has reference to the degree of freedom from harmless extraneous material (such as stems or leaves), peel, pits, pieces of pit, and damage from mechanical, pathological, insect, or other injury. "Blemished units" are units that are blemished with scab, hail injury, discoloration, or other abnormality covering an aggregate area exceeding the area of a circle ¼ in. in diameter. Units with black or very dark spots, worm holes, or serious insect damage are considered blemished units, regardless of the area of the injury. "Normal shape" means that the halves retain their original conformation although there is evidence of trimming. Halves with holes through the unit or halves that possess deep gouges in the back or sides are not of normal shape. "Crushed or broken units" are units that have been crushed or broken to the extent that they have lost their normal shape. Peach halves that are slightly split from the edge to the pit cavity are not considered broken unless the units are not of normal shape.

Under the factor of character of fruit consideration is given to the texture and condition of the flesh of the peaches. Softness and fraying of the edges, with free particles in the liquor, indicate proper maturity and are com-

mon to freestone peaches. "Mushy" peaches are wholly disintegrated peaches that are so soft they present a pulpy mass.

If the peaches possess a tender, fleshy texture, a score of 31 to 35 points may be given.

If the peaches are reasonably tender, a score of 25 to 30 points may be given. If the peaches are variable in texture, a score of 19 to 24 points may be given. Peaches that possess a noticeably variable texture and fail to meet the requirements of the above paragraph may be given a score of 0 to 18 points and shall not be graded above U. S. GRADE D, regardless of the total score for the product.

Peaches that are so firm that the units are pierced by a weight of more than 300 grams in accordance with the method prescribed in the Standard of Quality shall not be graded above OFF-GRADE, regardless of the total score for the product, and (except for Solid-Pack peaches) shall be certified with the additional statement "Below Standard in Quality—Not Tender." If more than 50 percent by weight of the peaches are "Mushy," the peaches shall not be graded above OFF-GRADE, regardless of the total score for the product.

When certifying samples which have been officially drawn and which represent a specific lot of canned freestone peaches, the grade will be determined by averaging the score of all containers, provided not more than one-sixth of the containers fail in some respect to meet the requirements of the grade indicated by the average score.

However, none of the containers may fall more than 4 points below the minimum score for the grade indicated by the average score, and if one-sixth or less of the containers fail to meet the requirements of the indicated grade by reason of a limiting rule, the average score of all containers for the limiting factor must be within the range for the grade indicated by the average total score.

This tolerance does not apply if any container falls below any applicable standard of quality promulgated under the Federal Food, Drug, and Cosmetic Act.

ISSUED: June 5, 1942
EFFECTIVE: July 1, 1942

Processed Raisins

(Tentative)

Processed raisins are dried grapes of the Vinifera varieties which have been properly stemmed, capstemmed and cleaned. They may include the following types (varieties):

Type I—Thompson Seedless (Sul-

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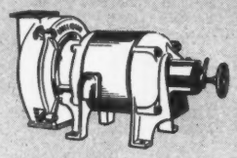
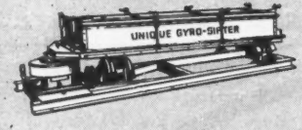


MIXING

SIFTING



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tanina), (a) Unbleached (natural); (b) Sulphur Bleached or Golden Bleached; (c) Soda Dipped.

Type II—Muscats, (a) Seeded (seeds removed); (b) Unseeded (loose); (c) Soda Dipped Unseeded (Valencia).

Type III—Sultana.

Thompson Seedless (Sultanina) raisins are usually graded for size, and official inspection certificates will indicate the size or combination of sizes found upon examination. *Small (midget) size* raisins are practically uniform in size, and the majority will pass through round perforation 19/64 in. in diameter. *Medium size* raisins are practically uniform in size, and the majority will pass through round perforations 24/64 in. in diameter but will not pass through round perforations 19/64 in. in diameter. *Large size* raisins are practically uniform in size, and the majority will not pass through round perforations 24/64 in. in diameter. *Custom size* raisins are raisins in which two or more sizes are blended, such as "Large and Medium blend" and "Large, Small, Medium blend."

Muscat raisins are usually graded for size, and official inspection certificates will indicate the size or combination of sizes found upon examination, such as "4 and 3 Crown blend" or "4, 3 and 2 Crown blend." *4 Crown* are raisins that have passed over a screen of round perforations 42/64 in. in diameter. *3 Crown* are raisins that have passed through a screen of round perforations 42/64 in. in diameter but have not passed through a screen of round perforations 34/64 in. in diameter. *2 Crown* are raisins that have passed through a screen of round perforations 34/64 in. in diameter but have not passed through a screen of round perforations 24/64 in. in diameter. *1 Crown* are raisins that have passed through a screen of round perforations 24/64 in. in diameter.

U. S. GRADE A Thompson Seedless unbleached raisins are generally pliable, generally meaty and plump, and generally well developed, possess a good typical color, contain not more than 18 percent moisture nor less than 68 percent sugar and meet the requirements for U. S. GRADE A shown in Table I(a).

U. S. GRADE B Thompson Seedless unbleached raisins are generally pliable, generally meaty and plump, and fairly well developed, possess a fairly good typical color, contain not more than 18 percent moisture nor less than 68 percent sugar and meet the requirements for U. S. GRADE B shown in Table I(a).

OFF-GRADE Thompson Seedless unbleached raisins are raisins that fail to meet the requirements of U. S. GRADE B.

Comparable specifications and tables are given for the various grades (U. S. GRADE A, U. S. GRADE B, and OFF-GRADE) of the other six types of raisins listed in the first paragraph of this abstract, except that there is no U. S. GRADE A Soda Dipped Unseeded Muscat raisin.

TABLE I (a)

Defects	U. S. Grade A Maximum tolerance (by weight)	U. S. Grade B Maximum tolerance (by weight)
Black, poorly developed, hard or red berries, blow-overs and shells	1%	2%
"B" berries (if sizes are blended, tolerance for largest size in blend shall apply)	2% for large size, 1½% for medium size, 1½% for small size	3% for large size, 2½% for medium size, 2¼% for small size
Damaged	2%	3%
Visibly sugared	5%	10%
	Maximum count (per pound)	
Capstems	15	25
Pieces of stem	1	2

Official inspection certificates covering Thompson seedless sulphur bleached or golden bleached raisins will indicate the color found upon examination in accordance with the following classifications: *Extra Fancy Color*—Practically uniform yellow or light amber with not more than 2 percent by weight of definitely dark berries. *Fancy Color*—Generally uniform yellow or light amber with not more than 5 percent by weight of definitely dark berries. *Extra Choice Color*—Fairly uniform amber color with not more than 10 percent by weight of definitely dark berries. *Choice Color*—Generally amber with not more than 15 percent by weight of definitely dark berries in sulphur bleached nor more than 20 percent by weight of definitely dark berries in golden bleached. The color may lack uniformity.

"Plump and meaty" means that the raisins are not "thin" or angular with coarse wrinkles. "'B' berries" mean raisins affected with mold or decay which show a positive reaction when immersed in a 3 percent hydrogen peroxide solution. "Visibly sugared" means the accumulation of crystallized fruit sugars which is readily apparent on the surface. "Capstems" mean small woody stems exceeding ⅛ in. in length which attach the raisins to the branches of the bunch and which have not been detached from the berry in stemming operations. A "piece of stem" means a portion of the branch or main stem. "Damaged" raisins mean raisins affected by insect injury which may or may not show live insects, insect remains or excreta and raisins affected by injury from sunburn, scars, mechanical injury or other means which seriously affects the appearance, edibility, keeping or shipping quality of the raisins.

ISSUED: Feb. 11, 1942
EFFECTIVE: March 2, 1942

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

QUALITY CONTROL

Enzyme Activity During Cold Storage

BECAUSE the chief changes which occur in storage at temperatures below 32 deg. F. are enzymatic rather than bacterial, the kinetics of three typical enzyme systems were studied in the temperature range from —95 to 122 deg. F. The higher range was included to determine whether enzyme activity at low temperatures could be predicted from a knowledge of the kinetics at higher temperatures.

Hydrolysis of tributyrin by pancreatic lipase, casein by trypsin, and sucrose by yeast invertase were selected as the type systems. Activation energy data are presented which show that for all three classes of foods the rate of hydrolysis increases exponentially with temperature, according to the Arrhenius equation, but for each enzyme there is a sharp break at 0 to —2 deg. C. (32 to 26.4 deg. F.), with much reduced activity below that temperature. There is no permanent inactivation of these enzymes by very low temperatures, although no measurable hydrolysis occurred in one month at —94 deg. F.

The high activation energies at low temperatures mean that in food storage small decreases in temperature will be relatively very effective in retarding enzyme activity. For these three enzymes a unit decrease below 26.4 deg. F. is roughly five times as effective as a similar decrease above 32 deg. F. However, the enzymes are not in any way destroyed and when cold storage foods are returned to normal temperatures enzyme action will regain its original rate.

Digest from "Kinetics as a Function of Temperature of Lipase, Trypsin, and Invertase Activity from —70 to 50 deg. C. (—94 to 122 deg. F.)" by I. W. Sizer and E. S. Josephson, *Food Research*, vol. 7, 201–209, 1942.

Water-borne Bacteria

WELL waters with initially low bacterial count often develop much higher counts on standing in closed containers. The type of container and its size, up to 80 gal., appear to have relatively little effect on the numbers of bacteria developed. At a number of dairies samples were examined when fresh from the well, and these counts were compared with those on the same waters after they had been mailed to a laboratory. Very large increases were found after the delay. The question is raised as to the reason why these same organisms do not develop in the well itself.

The types of bacteria which multiply in water are chiefly non-saccharolytic, gram-negative organisms of the general nature of *Alcaligenes*, *Pseudomonas* and *Achromabacter*. Many of them are lipolytic, proteolytic and oxidase-positive. Obviously, such bacteria are highly injurious to stored meats, fish, butter and other nonacid, protein or fatty foods.

Low concentrations of chlorine are effective in keeping down bacterial growth in process water. Preliminary experiments indicate that as little as 1 p.p.m. keeps the bacterial count low and prevents aftergrowth for several days. Smaller concentrations, 0.12 to 0.37 p.p.m., caused a temporary growth lag, but this was followed by faster growth than in unchlorinated water.

Digest from "Multiplication of Bacteria in Water and Its Significance in Food Spoilage," by C. H. Castell and L. A. McDermott, *Food Research*, vol. 7, 244–53, 1942.

BAKING

Monostearin in Cake

GLYCERYL monostearate (monostearin) has been tested as an improver in a conventional plain cake formula, using various shorteners. For comparison a commercial monoglyceride-type improver was also tested. Proportions were adjusted so that 1.7 percent of shortening was replaced by glyceryl monostearate: 1.5 percent as the monostearate, 0.1 as free stearic acid and 0.1 as potassium stearate. Shorteners were butter, oleomargarine, hydrogenated vegetable oil and modified lard. The oleomargarine cakes had low compressibility; were too crumbly; and although fine-grained, they also had large holes. Quite aside from the performance of shortenings, glyceryl monostearate improved quality in every case.

To judge the improvement by a strictly objective test the volume index was measured. In cake with butter shortening the volume index was increased 9.3 percent by the commercial monoglyceride preparation. The increases through the use of glyceryl monostearate in cakes with different shortenings were:

Butter	11.0
Modified lard	8.5
Hydrogenated vegetable oil	6.7
Oleomargarine	6.0

Digest from "The Effect of Glyceryl Monostearate on the Baking Properties of Cakes," by Ruth Daum, E. G. Halliday and W. F. Hinman, *Oil and Soap*, vol. 19, No. 2, 39–41, 1942.

DAIRY PRODUCTS

Vitamin Content of Defatted Milk Solids

VITAMIN CONTENT of defatted milk appears from vitamin assays to be entirely unrelated to the composition or the geographic origin of milk, according to test results for 32 samples from the principal dairy states. Lack of correlation may be partly due to masking of existing relations by lack of adequate representation in sampling, variations in pasturage, breed of dairy herds, and other factors. Defatted milk solids contain enough riboflavin to serve as a good nutritional source.

Digest from "Composition and Thiamin and Riboflavin Content of Defatted Milk Solids," by C. M. O'Malley and E. J. Baldi, *Journal of Milk Technology*, vol. 5, 138, 1942.

Curd Washing for Cheese

EXCESSIVE acidity of high-moisture brick cheese can be avoided by mildly washing the curd. This process consists of adding 25-lb. of water per 100-lb. of milk to the curds and whey, then removing 50-lb. of the whey and replacing it with 50-lb. of warm water.

The method works well with good-quality milk, but any defects are magnified by the curd-washing process. A mixed culture of *Streptococcus lactis* and *thermophilus* works better than either alone.

Digest from "The Bacteriology of Brick Cheese. II. Comparison of Washed-Curd and Conventional Methods of Manufacture," by E. M. Foster, J. C. Garey, and W. C. Frazier, *Journal of Dairy Science*, vol. 25, 313–21, 1942.

Coliform Organisms In Commercial Ice Cream

FACTORY-packed ice cream and sherbet samples from 14 factories in Minnesota, and samples of scoop and dipper-serv-

ings from stores and confectioneries, were examined for coliform bacteria.

Brilliant green lactose in bile broth culture appeared to be a better presumptive medium for detecting coliform organisms than violet red in bile agar when the counts were low, as they were in most of these samples. Brilliant green was used at the relatively high concentration of 1:30,000 since it did not appreciably inhibit growth in the cultures.

The observed range of coliform count was from 0 to 9,180 per milliliter. More study is needed before a generally applicable standard can be established, but the results indicate that the count in factory-packed ice cream should be below 10 per milliliter.

Digest from "A Study of the Coliform Group in Ice Cream," by H. J. Fournelle and H. Macy, *Journal of Dairy Science*, vol. 25, 475–87, 1942.

Drying Butter Fat

A NEW factory at Auckland, New Zealand, will handle more than 10,000 tons of butter annually, using a process developed at the Dairy Research Institute factory at Palmerston North.

Butter is melted by a steam jet, then the melted mixture is allowed to settle for a short while. The watery portion is passed through serum separators to remove water, salt and curd. The fat rich portion is passed through a cream separator, a pasteurizer and two more cream separators.

The final water removal is accomplished in a steam-jacketed chamber under high vacuum.

The dry, pure butterfat is cooled in a special rotary cooler and vacuum packed in 4-gal. tins. Filled tins are held at 45 deg. F. for several days to permit crystallization of the butter fat before export shipment.

The dried butterfat can be transported without refrigeration, although a lower temperature during storage and transportation gives a longer life.

Saving in space is not great, due to the necessity for using tins and shipping cases, but it amounts to three or four percent.

Digest from "Drying Butterfat, Interesting Process Devised," *Auckland Weekly News*, June 10, 1942.

CONFECTIONERY

Lecithin Emulsifier

AN improved emulsifying agent for use in enrobing chocolate and other chocolate products, and in candies which are heated to a relatively high temperature, has been developed by adding a water-insoluble soap such as aluminum stearate or oleate to soybean lecithin. This mixture in chocolate gives better reduction of viscosity than does lecithin alone, and avoids the tempering difficulties that are encountered when the salts alone are used.

Digest from U. S. Patent 2,287,838, issued June 30, 1942, to Joseph Stanley, Jackson Heights, N. Y., and assigned to American Lecithin Co.

BEVERAGES

Improved Coffee Extracts

A RECENT patent specification discloses that a hydrogenated vegetable oil, preferably coffee oil, added to coffee beans before or immediately after roasting, will improve the flavor and aroma of the beverage made from them by retaining certain easily destroyed constituents of the coffee beans. The hydrogenated oil will prevent other vegetable oils from becoming rancid. The method is of particular value in the production of extracts from coffee itself, although it can also be used in the production of coffee substitutes.

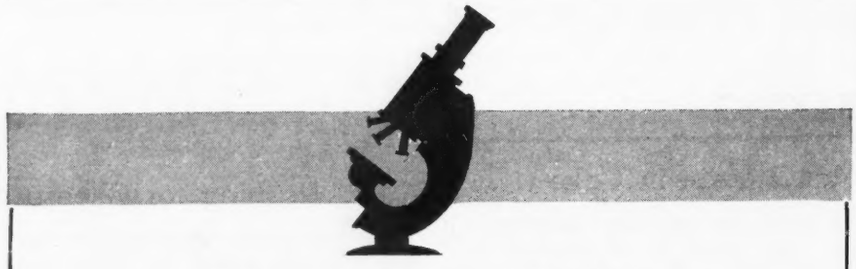
An earlier patent to the same patentee covers the use of an enzyme conversion to improve the flavor and aroma of coffee extracts. The preferred enzyme is taka-diastase. Extraction of the ground, roasted coffee is carried out in the presence of the enzyme, at a temperature of 120 to 130 deg. F. and pH between 5 and 5.5. This increases the amount of substance extractable from the coffee and makes possible the incorporation or preservation in the extract of certain aromatic and flavoring ingredients which are not present to the same extent in instant coffee heretofore produced.

Digest from U. S. Patent 2,288,284, issued June 30, 1942, and U. S. Patent 2,282,139, issued May 5, 1942, both to John L. Kellogg, Chicago, Ill.

Flavor Deterioration In Canned Orange Juice

OFF-FLAVORS developed in canned Valencia orange juice are believed to be due, at least in part, to oxidative changes. Tests were made with antioxidants: asparagine, α-naphthol, methyl-p-aminophenol (Elon), hypophosphorous acid and resorcinol, at concentrations of 2, 4 and 6 p.p.m.; chloresterol, at 15, 22 and 30 p.p.m.; d-isoascorbic acid, at 30, 60 and 100 p.p.m.; and methyglucamine, at 200 and 500 p.p.m. The packs were made in a canning plant as part of a regular run.

No relation was found between changes in peroxide value and taste of the product, but adventitious introduc-



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tion of peel oil into the experimental pack may have been partly responsible for this lack of correlation. The peroxide value of the petroleum ether extract from the canned juice indicated that some of these antioxidants were effective in prolonging the induction periods. Three induction periods observed probably represent successive oxidation of terpenes, fats and resins.

None of the antioxidants in the amounts used prevented destruction of sulphhydryl compounds or formation of higher ketones in the canned juice.

Toxicity was considered in the selection of the antioxidants, but some of these have not been proved harmless when consumed with foodstuffs. If such material is to be offered for public consumption, the manufacturer must first establish its harmlessness, in compliance with the Federal Food, Drug and Cosmetic Act.

Digest from "Experiments with Antioxidants for Preventing Flavor Deterioration in Canned Orange Juice," J. Nolte, G. N. Pulley and H. W. von Loesecke, *Food Research*, vol. 7, 236–43, 1942.

MISCELLANEOUS

Sulphuring Fruits

REDUCED quality of product, delay in operations during the drying season, and actual loss of sulphur through failure to burn may occur when contaminated sulphur is used. Such sulphurs develop a black film over the molten surface, which gradually decreases the burning area and extinguishes the flame. Both laboratory and field tests were made, and it was found that under field conditions the effect is much more pronounced.

The film was found to be largely carbon or carbonaceous matter with some traces of inorganic material, probably originating from the reaction of molten sulphur or sulphur vapors with small admixtures of organic impurities. Petroleum oils and turpentine produced the worst film, and showed greatest reduction in the percentage of the sulphur burned. Samples stored two to six days at room temperature in an atmosphere of vapors from fuel oil showed increased black-film formation and loss in burning.

Raising the temperature of the pans for burning the contaminated sulphurs to about 390 deg. F. gave almost complete combustion, and even 300 deg. F. showed great improvement. Methods are suggested for increasing the temperature. Poor burning sulphurs can be treated with solvents to increase the percentage burned, but this is not practical under farm conditions.

Digest from "Some Factors Affecting the Burning of Sulphurs Used in Sulphuring Fruits," by C. S. Bisson, H. W. Allinger and H. A. Young, *Hilgardia*, vol. 14, 361–72, 1942.

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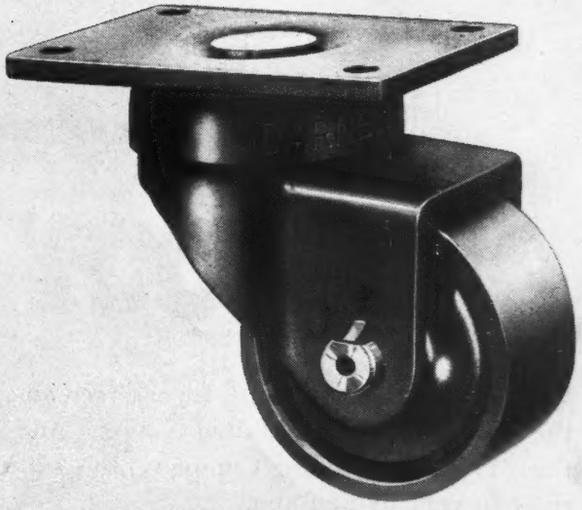

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FORMULAS FOR FOODS

Making Dried Fruit Bars For the Army K Ration

FORMULA NO. 348

For the past year and a half the Division of Fruit Products, at the College of Agriculture, University of California, has experimented on the preparation of fruit bars for possible inclusion in Army emergency field rations such as the present Type K ration.

Dried fruits are the most convenient and easily available fruit products for making such a bar. To provide a maximum of fruit, the usual candy ingredients such as fondant, chocolate, caramel, and so forth, should be omitted. Since nuts soon become rancid, it appears necessary to omit them also. A fairly tart flavor seems to be preferred by the Army.

Most dried fruits, with the possible exception of raisins, become hard and more or less concrete-like when bone dry, and in countries such as Libya they soon become bone dry. It is therefore advisable to add some honey, invert sugar sirup or glycerine to the mixed ground fruit, so that the bar will not become so hard that it cannot be eaten. Also, it must not freeze up to a pavement-like consistency at 0 deg. F., as ski troops may wish to use it. Hence the moisture content must be low. Bars of 14 to 20 percent moisture remain edible in texture at 0 deg. F. and do not become unduly soft at 130 deg. F.

Fig paste, pitted prunes, dried apricots, raisins and pitted dates high in invert sugar content can be used. Various combinations can be made, keeping in mind the necessity of invert sugar in some form to prevent hardening on drying out in the field. For civilian use, or for immediate Army use, chopped nuts may be added to the mix, up to about 20 or 25 percent. Pitted prunes unavoidably carry an occasional small piece of pit, and they must be ground very finely so that no large pieces remain to injure some doughboy's teeth. Prunes are very healthful and should be included if possible. Apricots furnish tartness, color and high vitamin values.

It is advisable to pasteurize the bars after wrapping, to reduce the hazard of insect infestation. As insects dearly love dried fruits, the bars must be stored in tight rooms and fumigated with methyl bromide once a month, or packed in insect-proof metal containers.

For Army specifications covering composition and packaging of fruit bars, apply to Lt. Col. R. H. Isker or Capt. V. O. Wodicka, Chicago Quartermaster Depot, 1819 West Pershing Rd., Chicago, Ill.

The following formulas appear promising:

Formula I

Fig paste	3 lb.
Prunes, pitted*	3 lb.
Apricots, dried, finely ground	3 lb.
Honey or heavy invert sirup	1 lb.

* Prunes must be finely ground

Formula II

Fig paste	3 lb.
Apricots, dried, ground	6 lb.
Honey or invert sirup	1 lb.

Formula III

Fig paste	3 lb.
Apricots, dried, ground	3 lb.
Raisins, ground*	2 lb.

* Preferably seeded Muscat, these may be replaced by dates of high invert sugar content.

Formula IV

Apricots, dried, ground	3 lb.
Raisins	3 lb.

Formula V

Pitted dates of high invert sugar content.

Formula VI

Apricots, dried, ground	3 lb.
Dates, pitted, high invert sugar content	3 lb.

Mixing Directions

The average moisture content must be below 20 percent in the finished product, according to Army specifications.

Grind the fruit, mix, then regrind. Extrude in a sausage machine fitted with a rectangular opening. Cut to desired size, which is 2 oz. for Army use. Wrap in moistureproof cellophane, then again in heavy cellophane. Heat in air until the centers of the bars are at 140 deg. F. Cool in air. For Army use pack in insect-proof containers such as 5-gal. cans.

Formula from W. V. Cruess and J. La Moglia, Division of Fruit Products, College of Agriculture, Berkeley, Calif.

FORMULA NO. 349

Milk Chocolate Ice Cream

Heavy sweet cream*	30 lb.
Condensed skim milk	30 lb.
Sugar, granulated	10 lb.
Corn sirup solids	5 lb.
Malt sirup	2.5 lb.
Cocoa powder	2.6 lb.
Gelatine	0.3 lb.
Soybean lecithin	0.1 lb.
Water	19.5 lb.
Total	100.0 lb.

* Use sweet cream with 40 percent butterfat content.

Procedure

Combine cocoa powder with equal parts of granulated cane sugar and mix dry, then add the water. Prepare the chocolate sirup by adding the lecithin and malt sirup with the aid of an agitator until smooth.

Place cream and condensed skim milk in the pasteurizing tank and apply heat. When the temperature on the recording chart of the pasteurizer reaches 120 deg. F., add the remainder of the granulated sugar, the gelatine, and corn sirup solids. Finally add the prepared chocolate sirup and proceed with the pasteurization process by heating the complete chocolate ice cream mix to 155 deg. F. for 30 minutes. Homogenize at 2,500 lb. pressure. Cool to about 45 deg. F. Place in storage tank until ready to freeze.

The preparation of the chocolate sirup is best accomplished in a steam-jacketed receptacle or double boiler.

This formula has been prepared in consideration of the present shortage of cocoa products. Also, the malt sirup and corn sirup solids replace cane sugar to some extent.

Formula from B. I. Masurovsky, Consulting Dairy Chemist.

FORMULA NO. 350

Tomato Spread

Ripe tomatoes	50 lb.
Sugar	5 lb.
Salt	3.5 lb.
White pepper	2 oz.
Ground ginger	1 oz.
Cayenne	¼ oz.

Method

Wash tomatoes and dip first in boiling water and then in cold water. Drain and skin.

Break them up and place in steampan, add the other ingredients through

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a fine sieve. Turn on steam gently, stirring continually, and bring to boil. Simmer till quite thick.

Fill jars at not less than 200 deg. F. and cap.

Formula from H. B. Cronshaw, Surrey, England.

FORMULA NO. 351

Griddle Cake Mixture

Sugar	5 lb. 8 oz.
Salt	2 lb.
Vegetable shortening	10 lb.
Milk powder	6 lb. 8 oz.
Soda	2 lb. 4 oz.
Phosphate baking cream	4 lb. 8 oz.
Malted milk	4 oz.
Pastry flour	90 lb.
Rice flour	5 lb.
Corn flour	5 lb.

Mixing Directions

Mix ingredients together dry. When ready to use add 1 to 1.5 lb. of water slowly to each 1 lb. of mixture. Cook quickly on hot griddle.

Because of the controlled leavening action, batter can be held over for hours, or used the following day.

Formula from Parker-Broeg.

FORMULA NO. 352

Praline Crunch

Granulated sugar	1 lb.
Butter	1 lb.
Nut meats, roasted	8 oz.

Directions

Nut meats should be chopped, not too fine. Melt the sugar to a golden brown, 340 to 350 deg. F. Remove from the fire and thoroughly mix in the nut meats and butter. Pour onto a buttered bun pan. When cool, crush.

This can be used in icings or to dress the top and sides of a cake.

Formula from General Mills, Inc.

FORMULA NO. 353

Lacto-Patty

Lean pork trimmings	65 lb.
Regular pork	35 lb.
Dry milk solids, not over 1½% fat	8 lb.
Salt	2½ lb.
Cure*	1 qt.
White pepper	6 oz.
Rubbed sage	3 oz.
Paprika	1 oz.
Garlic powder	¼ oz.

* Cure same as that given in Formula 324.

Mixing Directions

Grind meat through a 1-in. plate and place in mixer. Add salt, pepper, sage, paprika and garlic, and mix well. Start the mixer and sprinkle cure, dry milk solids and spices over the meat. Add about 1 gal. of cold water while mixing. Run all material through a ⅜- or ¾-in. plate. Stuff into 1-lb. cellulose containers. Chill package to facilitate slicing into patties.

Formula from American Dry Milk Institute.

FORMULA NO. 354

"Homemade" Fudge Icing

Granulated sugar	4 lb. 8 oz.
Corn sirup	12 oz.
Milk	1½ pt.
Concentrated maple sirup (2½ fold)	8 oz.
Butter	6 oz.

Mixing Directions

Boil the granulated sugar, corn sirup and milk together to 234 deg. F., and at the finish of the cook, add the concentrated maple sirup. Cook to 130 deg. F. Finally, add, and mix until smooth, 6 oz. of butter and sufficient icing sugar to give the consistency desired. Apply warm or at about 110 deg. F.

Formula from Quebec Maple Sugar Producers.

FORMULA NO. 355

Basic Sweet Yeast Dough With Soya Flour

Spring short patent flour	80 lb.
Soft winter wheat flour	12 lb.
Soya flour	8 lb.
Liquid, water or milk,	67 lb.
Yeast	4 lb.
Salt	1 lb. 11 oz.
Sugar	15 lb.
Malt	2 lb.
Egg yolks	4 lb.
Shortening	4 lb.
Butter	4 lb.
Flavor	Variable*

* Quantity of flavoring needed depends on the strength and type used. Do not use too much.

Directions

Straight Dough Method

Dissolve the yeast in the milk or water, whichever liquid is used. Cream the sugar, shortening, salt and flavoring to a light consistency. Add the eggs to the sugar-shortening emulsion in small portions, and gradually, to prevent destroying the first emulsion formed. Then fold in the flour that has previously been sifted together.

Mixing time (high speed), 10 to 15 minutes. Dough temperature, 80 to 82 deg. F.

Fermentation: first fold, 1 hour 15 minutes; second fold, 30 minutes; rest, 15 minutes.

Formula from Stein, Hall Mfg. Co.